

The Iron Age

A Review of the Hardware, Iron and Metal Trades.

Published every Thursday Morning by DAVID WILLIAMS, No. 83 Reade Street, New York. Entered at the Post Office, New York, as Second-Class Matter.

Vol. XXVIII: No. 3.

New York, Thursday, July 21, 1881.

\$2.50 a Year, Including Postage.
Single Copies, Ten Cents.

The Duplex Safety Boiler.

The growing favor with which tubular boilers are received by those employing power, is due to advantages which have become generally recognized and to improvements in their construction, in consequence of which inconveniences in their use have been removed. It is conceded that, so far as safety is concerned, experience has proved them to be far in advance of older types, but to secure safety, economy and durability were often sacrificed. These essentials are not, however, incompatible with safety. Among the more recent designs of tubular boilers is that by the Duplex Safety Boiler Company, of this city, which has been brought to its present shape, shown in the accompanying illustration, after a series of improvements extending over the past few years. The boiler is composed of vertical sections, suspended from a horizontal drum, the number of the sections depending upon the size of the boiler. Each consists of a cluster of eight tubes surrounding one central one, each one of the outer tubes having within it a 2-inch tube, which extends through the upper and lower chamber. The upper and lower ends are held by gun metal chambers shown in the engraving. A large body of water is thus exposed to the fire in the thin sheets, which it occupies between the inner and outer tubes of the eight tubes of each section. The tubes are extended into the chambers, recess being accurately bored and reamed for its reception. The central tube, with an area greater than the aggregate area of the tubes around it, has no interior tube. Each section is suspended from the drum by a branch, and can be readily removed for repairs. The drum is small in diameter, and as it must be strong to support the weight of the sections filled with water, it is made of the best charcoal hammered iron, of ample thickness, and is thoroughly braced, so that it will resist pressures much higher than it is subjected to in use.

The boiler thus formed of the drum and sections is set in brickwork in the ordinary way, the furnace proper, which is sometimes provided with the Rogers shaking grate, having one compartment which forms a combustion chamber. It incloses the principal portion of the sections. For the purpose of utilizing the waste heat of the escaping gases, one or more sections are placed back of the bridge wall. The hot gases pass around the drum also. The circulating pipe shown connects the lower portions of the sections, and through it the feed water is introduced and the boiler blown off.

In the operation of the boiler, the fire surrounds the tubes and chambers of the sections, and also passes up through the inner tubes. The water contained within the sections, being divided into thin sheets, is practically in the fire, divided from it only by a thin plate of iron. Steam is generated rapidly and rises in the outer cluster of tubes to the upper chamber, carrying water with it. At the connection of the section with the drum, the steam rises into the latter, while the water passes downward through the center tube to the bottom chamber. A very rapid circulation is thus secured, with all the advantages it offers in the rapid and economical generation of steam and in the prevention of the formation of scale. We are informed that a number of large establishments have adopted the Duplex boiler, and that tests made by consumers have given very good results.

The method of raising water by centrifugal pumps is well known, in which a rotary motion is imparted to a system of pallets in a stationary cylinder. M. De Romilly, in a recent note to the French Academy, describes a different system giving very good effects. In it a shallow cylinder without pallets is rotated, and the water, forced toward its periphery, is received into a vertical pipe passing through a wide opening in the top of the cylinder, and bending outward and round, so that its mouth is near the outer wall of the cylinder and faces the whirling liquid. The water rises to a height proportional to the square of the velocity. A laboratory apparatus of this type, driven by hand, raised water to a height of 150 meters. Where the turbine is placed above the source of water, the receiving tube is bent downward to the latter, and enters with horizontal point the conical end of another pipe, which extends upward to the reservoir. It is important to have lubrication corresponding in efficiency to the speed,

and for this purpose two smaller turbines, acting in a similar way with oil, are worked on the axis.

Employers' Liability for Injury to Workmen.

At the recent meeting of the Iron Trades' Employers' Association, of Great Britain, a report was read which dealt with the questions raised by the passage of the employers' liability act, and the best means for protecting members of the association from claims made by workmen under its provisions. A committee has gathered information as to the number of fatal and minor accidents, to show the risks in different departments of the iron trade:

Returns have been received from employers of 30,000 workmen, and taking all the different departments of the engineering, shipbuilding, iron founding, and machine-making trades it was found that of 88,290 men who have been under risk in these several trades, during the three years, 39 have met with fatal accidents, and 2002 have met with minor accidents, which in every accident reported, brought all risks without

their only guide, but a careful consideration of the remarks given in the schedules showed plainly that by far the largest proportion of the accidents could not be traced to the negligence of the employers, but that in fact it might be safely assumed that fully 75 per cent. might be attributed to the carelessness of the workmen; and so far as the minor accidents were concerned, they appeared to be singularly slight. After prolonged and very minute investigation of the facts before them, the committee concluded that it was desirable to base the proposed rate of premiums for insurance upon the amount paid annually as wages, rather than upon the fluctuating numbers of men and boys employed at any given time. They had also re-adjusted their classifications, and had placed marine engineers among the general engineering divisions of the iron trade, shipbuilders and machinists, thus forming distinct divisions. The terms upon which the committee had concluded to issue policies of insurance were as follows: Machinists, 2 per cent; engineers generally, foundrymen, millwrights, tool makers, locomotive makers, marine engineers, boiler makers, &c., 3 per cent; and shipbuilders, 4 per cent. The proposal is experimental, but it has

safe as could be demanded by any system of inspection. They were the more anxious to take this step from the fact that, in the course of a business which has covered over 20 years, only two boilers from their workshops have exploded. Accordingly, they set about the construction of a boiler the counterpart in every respect, save that of length, of the one which created such havoc in Kensington, for the purpose of subjecting it to the hydrostatic test until it burst, the intention being to ascertain how much pressure would be required to break a flat cast-iron head. The boiler, which was completed a few days ago, was 36 inches in diameter, 42 inches in length, and constructed of a substantial iron known in the trade as No. 3 Birmingham wire gauge. The door of the man-hole was the same which did a similar service in the Gaffney boiler.

Four o'clock yesterday was the hour fixed for the test. Invitations had been sent to the members of the jury which had pronounced against these heads, and to the Commission on Steam Boilers appointed by Mayor Stokley. At the time appointed five out of the six jurors (Messrs. J. B. Fontaine, of the firm of Fontaine, Abbott & Co., machinists; J. Shields Wilson, superintendent of Neafie & Levy's Penn Boiler Works;

gradually increased to 425 pounds, and the lookers-on were beginning to wonder whether the boiler would hold out forever, when a sudden crack was heard in the front head and the water commenced to run down from a fissure extending half-way across the head. The gauge showed that the boiler had given out at a pressure of 450 pounds, and a subsequent examination showed that the break had commenced at the leaky sand hole before mentioned. Had it not been for this defect the head would probably have stood an additional 50 pounds pressure before giving way. The measurement taken by Inspector Overy showed that the rear head had expanded 1-16th of an inch at 200 pounds, and 3-16th at the time of the break.

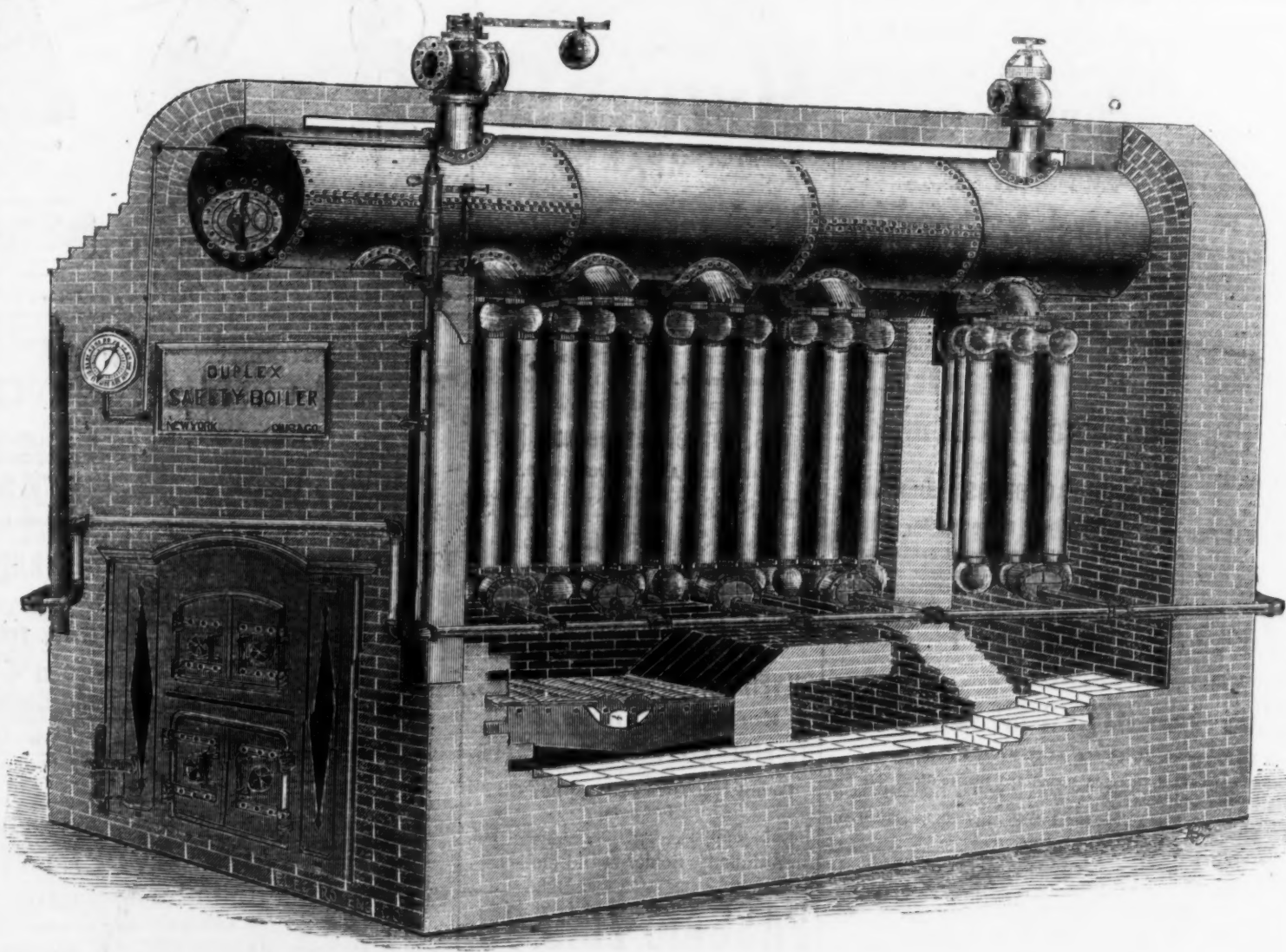
The members of the Coroner's jury had little to say concerning the result. Three of the five sat some distance away while the pressure was being applied, and apparently took but little interest in the proceedings. Before leaving they held a short confidential consultation, in the course of which one remarked: "This is no reflection on us. If we undertake to answer it we shall never be done of the subject." "Yes," responded another, "we would start a discussion which would never end." Several of the jurymen, when asked to give their opinion of the experiment, emphatically declined to express themselves on the subject.

Several weeks ago, when the Hartford Company decided not to pass any boilers with flat cast-iron heads over 32 inches in diameter, City Inspector Overy addressed a communication to City Solicitor West, asking what authority, if any, the City Inspector could exercise in the same direction, and also requesting advice as to how he should govern himself in passing upon steam boilers. In reply, the City Solicitor says that the questions are more fitted for a mechanical expert than for a lawyer, but that legally he would advise the inspector, when in his judgment a boiler is safe, to approve it and give a certificate, without regard to its mode of construction or the material used. Mr. Overy has consequently decided to adhere to his usual practice of passing all boilers with the obnoxious heads if they have safely withstood the cold water test.

Gen. J. B. Frisbie, lately from Mexico, where he has resided for several years, is now in New York city. He is non-committal in regard to the probability that the government will be able to pay its promised subsidies to railroad corporations, but repeats the remark made to him by the President of the Republic, a short time ago, that no more subsidies would be granted. He anticipates a gradual growth and development of the country under the stimulus of American enterprise, and that the revenues will be proportionately increased. In the almost total absence of modern machinery, all kinds of industries are in a very backward state, despite the natural advantages that nature has bestowed upon the country, but do not know how to use it, having neither banks nor corporations. Englishmen own the only bank, and Germans control the foreign trade. Skilled labor is scarce and commands good pay; machinists, for instance, receiving \$175 per month. The two railroads now building—National and Mexican Central—have about 20,000 men at work on them, and are destined to effect great changes, not only in putting some of the richest sections of the country in communication with the seaboard, but making it practicable to transport products, merchandise, machinery, &c., hither and thither as desired, relieving the mule of its ancient burdens.

Judge George W. McCrary, of the United States Circuit Court at Little Rock, Ark., has just rendered a decision in the suit brought by the Southern Express Company to restrain the Iron Mountain Railroad from charging the complainants higher rates on express matter than it charges for similar express matter received from or delivered to itself or the Pacific Express Company, and also from discriminating against the plaintiff in favor of itself or any other express company or person in the matter of rates. A temporary injunction was granted, which the respondent prayed should be dissolved. The motion was refused.

A steamer arrived recently in the Thames from the Clyde which is steered from an electric apparatus. The steering gear worked well, but the compasses were so affected by the electricity as to be useless.



THE DUPLEX SAFETY BOILER.

been indorsed by professional authority and declared to be a sound one. The terms which have been offered by insurance companies who have solicited the business of the association have been in the first instance so exorbitant as to altogether preclude their consideration, and, in an appendix to the report, it is pointed out that the total premiums required by companies in Manchester and London are 328 and 337 per cent. in advance of the committee's quotations.

Rupturing a Boiler by Hydrostatic Pressure.

An interesting experiment was made at Frankford, near Philadelphia, on the 13th inst., the object of which was to refute the conclusions of the coroner's jury in their verdict on the recent explosion of Gaffney & Dolan's boiler. The Philadelphia Record of the 14th inst. says:

The firm in question, Messrs. Sidebotham & Powell, were the builders of the boiler which exploded, with such disastrous results, at the dye works of Gaffney & Co., in Kensington, in the early part of June. The boiler had been placed in position, new from the workshop, less than a month before, and had been passed as perfect in every particular by the inspectors of the Hartford Company. The jury, however, ascribed the explosion to the improper use of cast iron in the flat head of the boiler, and the inspectors who certified to its safety were severely censured. The builders, instead of airing their opinions in print, determined to demonstrate that cast iron flat heads were as

Samuel R. Marshall, formerly of the Wilkesbarre Machine Works; W. W. Williams, president of Keystone Council of Stationary Engineers, and J. W. Nystrom, civil engineer, were on the spot. With them were Mr. John Overy, Chief of the City Department of Boiler Inspection, who had accepted the invitation to apply the test; Mr. J. Naylor, of the People's Foundry; Mr. J. H. Taylor, of Nicetown lane; Mr. S. N. Hartwell, of New York, a well-known boiler expert; nearly 100 prominent steam users from the city, Frankford and the neighboring settlements, and two inspectors of the Hartford Company.

When everything was in readiness the pressure was applied. The usual sapping at the rivets was apparent when the gauge registered 105 pounds, but beyond this the boiler did not exhibit any symptoms of a strain. At 130 pounds the water began to ooze through a small sandhole in the head, above the man-hole, showing that the head was slightly defective. The pressure was then reduced, while Inspector Overy affixed a contrivance to the rear end for the purpose of measuring the extent of expansion. Pressure was again applied until the gauge marked 140 pounds, then 160, 180 and 200. At this amount of pressure the seams on the side of the boiler began to weaken, and from one spot a spray of water as fine as steam was discharged. At 250 pounds this had increased to a good-sized squirt, and at 350 the water was issuing with such force as to be thrown 4 feet away. Still the heads remained intact. At 400 pounds half a dozen similar fissures appeared in a close row in the same seam. The pressure was then

Metals.

**ANSONIA
BRASS & COPPER CO.,**
No. 19 Cliff Street,
Phelps Building, NEW YORK.

BRASS AND COPPER

Sheets, Bolts, Rods, Wire, &c.
**Seamless Brass & Copper
Tubing.**

Ansonia Corrugated Stove Platforms.
PURE COPPER WIRE
For Electrical Purposes, Bare and Covered.
Phosphor Bronze Rods for Pumps, &c.

**ANSONIA ★ REFINED
INCOT COPPER.**

PHELPS, DODGE & CO.

IMPORTERS OF
**TIN PLATE,
ROOFING PLATE,**
Sheet Iron, Copper, Pig Tin, Wire,
Zinc, &c.

COPPER AND BRASS.

CLIFF STREET, NEW YORK.

SCOVILL MFG CO

**BRASS,
HINGES, WIRE, GERMAN SILVER.**

PHOTOGRAPHIC GOODS.

**BUTTONS,
CLOTH AND METAL.**

DEPOTS: 419 & 421 Broome St., N. Y.
177 Devonshire St., Boston.
183 Lake St., Chicago.

FACTORIES:
Waterbury, Conn.
New Haven, Conn.
New York City.

DICKERSON, VAN DUSEN & CO.,

Importers of
Tin Plate, Pig Tin, Sheet Iron, Copper,
Wire, Zinc, Etc.

99 & 31 Cliff St., cor. Fulton,
DICKERSON & CO., Liverpool, NEW YORK.

ROME IRON WORKS,

Manufacturers of
Brass, Gilding Metal, Cop-
per and German Silver
(In sheets, Rods, Tubing or Wire).

**COPPER & BRASS RIVETS
AND BURS.**

Rome, New York.

A. C. NORTHROP,

Waterbury, Conn.,

NOVELTIES IN BRASS AND OTHER METAL GOODS

FOR HARDWARE TRADE.

Wrought Iron and Brass Machine Screws; Turned, Hexagon, Round and Square Head Cap and
Set Screws; Brass and Iron Safety and Jack Chain; Gilt, Nickel Plated and Bronze Trimmings of all
kinds, from Sheet Iron, Steel or Brass.
Estimates on patented articles, or any description of Sheet Metal work, respectfully solicited and
promptly given.

WORKS

AT
TRENTON
N. J.

ROEBLING'S**WIRE ROPE**

New York Office

AND

Warehouse

117 Liberty Street.

THE JOHN A. ROEBLING'S SONS CO.,

MANUFACTURERS OF

WIRE ROPE

OF
Iron, Steel and Copper

FOR
Hoisting Purposes of all
kinds, for Ferries, Slays,
Ship Rigging, Sash Cords,
Lightning Rods, &c., &c.
Suspension Bridge Cables.

GALVANIZED

Telegraph Wire,
Market Wire,
Vineyard Wire.

Iron and Steel**WIRE**

FOR
Market Wire, Fence Wire
Bridge Wire, Chain Wire,
Buckle Wire, Spring Wire,
Rivet Wire, &c., &c.

GALVANIZED WIRE CLOTHES LINES.

BRODERICK & BASCOM,

MANUFACTURERS OF

IRON**WIRE ROPE.**

1728 N. Main St.

STEEL**WIRE ROPE.**

St. Louis, Mo.

Metals.**Waterbury Brass Co.**

CAPITAL, - - \$400,000.

Sheet, Roll and Platers' Brass,
GERMAN SILVER,
Copper, Brass and German Silver Wire,
BRASS AND COPPER TUBING,
COPPER RIVETS & BURS,
BRASS KETTLES,
Door Rail, Brass Tags,
PERCUSSION CAPS,
POWDER FLASKS,

Metallic Eyelets, Shot Pouches, Tape Measures, &c.
And small Brass Wares of every Description.
Cartridge Metal in Sheets or Shells a Specialty.
Sole Agents for the
Capwell Mfg. Co.'s Line of Sport-
ing Goods and Wood's Paper
Shot Shells.

DEPOTS: 296 Broadway, New York, WATERBURY,
189 Eddy St., Providence, R. I. Conn.

Manhattan Brass Co.,

Manufacturers of
Sheet Brass, Oils, Patent Oilers,
Brass Wire, Prior Patent Oilers,
Copper Wire, Broughton Patent Oilers,
Copper Rivets, Brass, Tin & Zinc Oils,
Brass Tubing, Brass Butt Hinges,
Zinc Tubing, Hurricane Lanterns,
Brown's Patent Picture Hooks.

Fire Sets, Fenders, &c.

BRASS BLANKS AND TUBES
OF EVERY DESCRIPTION TO ORDER.

OFFICE AND WORKS,
1st Ave., 27th to 28th Sts., New York.

**THE NEW HAVEN
COPPER CO.,**

255 Pearl Street, New York.

Manufacturers of and Dealers in

**Braziers' & Sheathing
COPPER.**

Kettle Bottoms, Bolts, Circles, Rivets,
Ingot Copper, Spelter, Solder, &c.

JOHN STARR,

Hardware & Metal Broker.

AND

MANUFACTURERS' AGENT.

Hallifax, Nova Scotia,

Representing in the Dominion of Canada several
American Manufacturers, is ready to accept
further Agencies. Satisfactory references.

Metals.**The Plume & Atwood
Mfg. Company,**

MANUFACTURERS OF

SHEET and ROLL BRASS and WIRE,

German Silver and Gilding Metal

Copper Rivets and Burs,

Kerosene Burners,

Lamp Trimmings, &c.

18 Murray Street, New York.

13 Federal Street, Boston.

109 Lake Street, Chicago.

Rolling Mill,

Factories,

THOMASTON, CT. WATERBURY, CT.

Bridgeport Brass Co.,

MANUFACTURERS OF

Sheet and Roll Brass,
Brass & Copper Wire & Tubing,
German Silver Metal and Wire
Copper and Iron Rivets.

OILERS and CUSPADORES, LAMPS and TRIMMINGS,
LANTERNS and TRIMMINGS, KEROSENE BURNERS,
Clocks & Fly Fan Movements, PLUMBERS' MATERIALS.
Particular attention paid to cutting out Blanks and
manufacturing Metal.

MANUFACTORY, BRIDGEPORT, CONN. 19 Murray St., N. Y.

THOS. W. FITCH, Pres. and Treas. A. A. LASAR, Secy.



ST. LOUIS, MO.

Holmes, Booth & Haydens,

WATERBURY, CONN.

NEW YORK, BOSTON,
49 Chambers St. 18 Federal St.

Manufacturers of all kinds of

Brass, Copper & German Silver,

ROLLED AND IN SHEETS.

BRASS & COPPER WIRE,

Tubing, Copper Rivets & Burs.

BRASS & IRON

JACK CHAIN, DOOR RAIL.

German Silver Spoons,

SILVER PLATED FORKS & SPOONS,

Kerosene Burners, &c.

JOHN DAVOL & SONS,

Agents for

Brooklyn Brass & Copper Co.,

Dealers in

Ingot Copper, Spelter, Lead, Tin,

Antimony, Solder & Old Metals.

169 John Street, New York.

PASSAIC ZINC CO.

Manufacturers of

Pure Spelter

FOR

Cartridge Brass, Gas Fixtures, Bronzes

AND ALL FINE WORK.

Also for

Galvanizers & Brass Founders.

MANNING & SQUIER, Gen'l Agents,

113 Liberty Street, N. Y.

Geo. W. Prentiss & Co.,

HOLYOKE, MASS.,

MANUFACTURERS OF

IRON WIRE.

Bright, Coppered, Annealed and Tin

Plated. Also GUN SCREW WIRE

Of all sizes straightened and cut to order.

The Schoenberg Metal Mfg. Co.,

Manufacturers of and Dealers in

SOLDER, TYPE,

Stereotype, Electrotype and Babbitt Metals,

Importers of Block Tin, Antimony, &c. Refiners of

Lead, Spelter, &c. Highest price paid for Old Metals

and all kinds of Brass. 525 and 539 East 20th

Street, between Avenue C & D, New York.

Wire, etc.

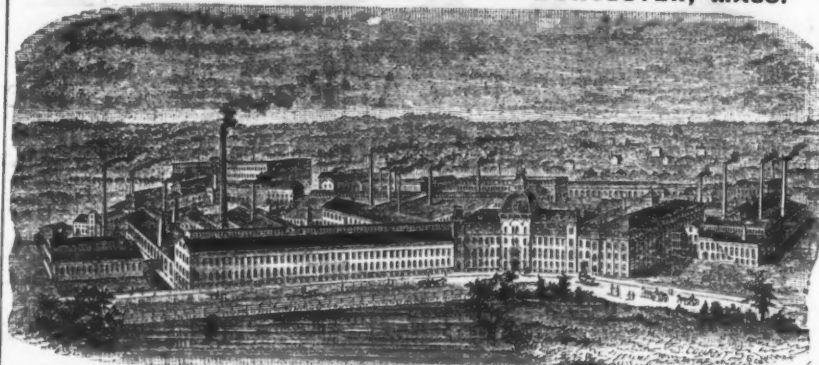
PHILIP L. MOEN, President & Treasurer.

CHAS. F. WASHBURN, Vice President & Secretary.

WASHBURN & MOEN MANUFACTURING CO.

Established 1831.

WORCESTER, MASS.

**IRON and STEEL WIRE,**

Patent Steel Barb Fencing, Patent Steel Wire Bale Ties.

WIRE RODS of all Grades. Round Iron, Rivet quality, 3/16 in. to 1 1/2 in., cut to any length. Owners and ex-
clusive Operators of the **PATENT CONTINUOUS ROLLING MILLS**, producing Iron and Steel WIRE, in
coils of 100 pounds, without seam or weld. Patent Galvanized Telegraph Wire, Market and Stone Wire, in
Annealed Fence and Grape Wire in long lengths: Coppered Rail-Rail Wire: Rope, Bridge, Bolt, Screw, Rivet, Buckle
and Chain Wire. Wire for the manufacture of Card Clothing, Heddles, Reeds, &c. Piano-string Covering Wire,
Tinned Broom Wire and Tinned-plated Wire of all sizes. A specialty is made of Clock, Machinery, Gun Screw and
Spiral Spring Wire, and Reduced Wire to Pattern for particular purposes, from selected stamps of Norway Iron.
Any grade of Wire furnished. Annealed, Bright, Polished, Coppered, Galvanized or Tin Plated. Wire furnished,
straightened and cut to any length. Steel Crapline Wire, Patent Linen finish. Unriveted Steel Haste
Wire. Steel Wire for Springs, Needles and Drills. Market Steel Wire kept in stock, all sizes.
WAREHOUSE, 21 Cliff Street, New York. St. Louis Warehouse, 802 North 2d St.
Chicago Warehouse, 107 Lake St.

"NATIONAL WIRE AND LANTERN WORKS."

Warehouse, 45 Fulton Street, New York.

HOWARD & MORSE,

MANUFACTURERS OF

WIRE CLOTH, WIRE WORK, WIRE FENCE & RAILING,

Also, AND RAILROAD LANTERNS.



ABRAM S. HEWITT, President. JAMES HALL, Treasurer.

WM. HEWITT, Vice President. E. HANSON, Secretary.

THE TRENTON IRON COMPANY,

(INCORPORATED 1847),

TRENTON, N. J., Manufacturers of

IRON and STEEL WIRE

OF ALL GRADES,

BRIGHT, ANNEALED, COPPERED, TINNED AND GALVANIZED;

Iron and Steel Wire Rods;

EXTRA QUALITIES OF BAR IRON AND RODS.

Best Qualities of Gun-Screw and Charcoal Iron Wire;

Crucible, Siemens-Martin and Bessemer Steel Wire.

Wire Straightened and Cut to Lengths.

New York Office, COOPER, HEWITT & CO., 17 Burling Slip.

Philadelphia Office, JOHN HEWITT, Agent, 21 North Fourth St.

IRON AND STEEL WIRE ROPE

For Hoisting, Running & Standing Ropes, Ferries, &c.

CONSTANTLY KEPT ON HAND.

Address, HAZARD MFG. CO., Wilkesbarre, Luzerne Co., Pa.

FELTEN & GUILLEAUME,

Carlsberg, near Cologne, Germany.

For Mining and Plow Ropes, Hawers and Bridge Cables.

PATENT CRUCIBLE STEEL WIRE,

SIEMENS-MARTIN and BESSEMER STEEL WIRE,

Flusselsen, Swedish and German Charcoal Wire.

GALVANIZED TELEGRAPH WIRE

of Charcoal and Swedish Iron and Steel, also with high conductivity, and in long lengths.

GALVANIZED STEEL WIRE,

For Plain, Barb and Strand Fencing, 3, 4 and 7-ply Strand, Staples, &c. Annealed and Oiled Fencing

Wire, round and oval.

WIRE ROPE

OF EVERY DESCRIPTION.

TELEGRAPH CABLES.

Contractors to the German and Foreign governments. The oldest house in the branch on the Con-
tinent. Telegraph Address, CARLSBERG, COLOGNE.

General Agents for U. S. and Canada,

PERKINS & CHOATE, 23 Nassau St., N. Y.

A. LESCHEN & SON,

Manufacturers of

WIRE ROPE

OF EVERY DESCRIPTION.

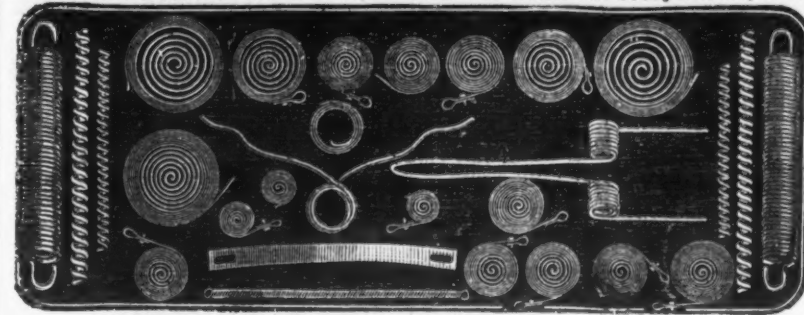
919 to 923 N. Main St., ST. LOUIS, MO.

Correspondence invited.



O. LINDEMANN & CO.,
Manufacturers of all kinds of
Japanned, Brass & Tin Plated
BIRD CAGES.
Catalogues furnished to the trade.
254 Pearl St., NEW YORK.

CARY & MOEN,
Manufacturers of
STEEL WIRE for all purposes and **STEEL SPRINGS** of every description.



Market Steel Wire, Crinoline Wire, tempered and covered.
Also Patent Tempered Steel Furniture Springs, constantly on hand.
934, 936 and 938 West 29th Street, NEW YORK.

YALE LOCKS.

YALE LOCK MFG. CO.

Office and Works,
STAMFORD, CONN.
Salesrooms,

53 Chambers Street, New York,
36 Pearl Street, Boston.
507 Market Street, Philadelphia.
64 Lake Street, Chicago.

BROWN & BROTHERS,

81 Chambers St., N. Y. Waterbury, Conn.
Manufacturers of

**BRASS, COPPER AND
GERMAN SILVER,**

In Sheets, Rolls, Rods, Wire, Tubing,
Rivets and Bars, Etc.

ALSO,

Seamless Brass & Copper Tubing.

PATENTED SEAMLESS BRASS AND COPPER
HOUSE BOILERS, warranted to stand 300 lbs.
pressure and guaranteed against vacuum.

PATENTED SPRING TEMPERED SHANK,
SILVER-PLATED, FLAT TABLE WARE, in rich
designs.

GERMAN SILVER SPOONS AND FORKS.

POPE, COLE & Co.

**BALTIMORE
COPPER WORKS,**

No. 57 South Gay St., BALTIMORE, MD.,
Have always on hand and for sale

INGOT COPPER,

Also Cakes, of unequalled purity and toughness.

IRON ROOF CRESTING,

WEATHER VANES,



Tower Ornaments, &c.
Also,
Wrought Iron Fence,
For Residences, Courts
Houses, Cemetery
Lots, &c.

**IRON SHUTTERS,
WINDOW GUARDS,**

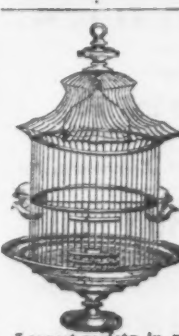


Balcony Railing, &c.

Parties wanting work in
this line will be furnished
illustrated catalogue and
price list upon application.

Manufactured by

**E. T. Barnum's Iron
and Wire Works,**
Detroit, Mich.



G. Gunther,

Manufacturer of
Patented Brass, Silver Plated
and Japanned

BIRD CAGES.

Can be nested for ex-
port shipments.

**46 Park Place,
NEW YORK.**

Schenectady Molding Sand Co.

**ALBANY AND SCHENECTADY
MOLDING SAND**
delivered on cars or boats at low rates. All grades
guaranteed. All orders will receive prompt atten-
tion. Address, **J. G. GREENE, Sec.,**
23 Wall St., SCHENECTADY, N. Y.
G. S. VEEDER, Pres.; J. G. GREENE, Sec. and Treas.

The Morris Sash Lock Mfg. Co.,

Manufacturers of
The Morris Sash Lock,
Pat. Combined Sash Lift & Lock,
Pat. Self-Locking Shutter Bar,
And specialties in Builders' Hardware.
214 and 216 Elm Street, CINCINNATI, OHIO, U. S. A.

**GAUTIER STEEL
DEPARTMENT**

OF THE
CAMBRIA IRON CO.,

PHILIP E. CHAPIN, Gen'l Supt.

**STEEL,
WIRE and
SPRINGS.**

JOHNSTOWN, PENN.

N. Y. Store, - - - 81 JOHN ST.

Phila. Store, - 505 COMMERCE ST.

MOULDING SAND.

Albany Sand a Specialty.

FOUNDRI FACINGS,

Shovels, Riddles, Brushes, &c.

**WHITEHEAD BROS.
AMERICAN FACING CO.**

WM. WHITEHEAD, Treas.,
517 W. 15th St.,
New York.

FACING
J. A. EMERICK & CO.
1056 & 1076 Beach Street,
PHILADELPHIA,
MANFRS' FOUNDRI FACINGS,
And Dealers in and shippers of all descriptions
MOLDING SANDS and Foundry Supplies.

Established 1810.

N. & G. TAYLOR CO.,
PHILADELPHIA,

Manufacturers, Importers and Dealers in

ODD AND REGULAR SIZES

TIN AND ROOFING PLATES,

Black and Galvanized Sheet Iron, Metals, Wire, Copper,
Stamped Ware, Registers, &c.

WOOD, JENNISON & CO.,

Manufacturers of **SHAFTING, PULLEYS AND HANGERS—A Specialty.**
Also, Wood's Patent Bolt Threading Machine. **Worcester, Mass.**

Papers on Practical Founding—XXX.

BY EDWARD KIRK.

CASTING.

Under this head I shall not attempt to describe the mode of melting the iron, for I have already described that part of the business at length in my work entitled the "Founding of Metals." I shall here only describe the process of filling the molds with molten iron after it has been melted. The work of casting or filling the molds with molten iron to form the castings is as important a matter as either the melting of the iron or the making of the molds, for it does not matter how hot and fluid the iron is, or how perfect the molds are made, perfect castings cannot be made unless the molten iron is properly poured into the molds. The usual time of casting in stove foundries is from 2 to 5 o'clock in the afternoon. This time is considered preferable to all others, because the work of casting always heats up the foundry and molding sand so that it becomes very hot and disagreeable work making any molds after the work of casting has been begun. The work of molding generally stops as soon as it is time to begin casting, and the later in the day the casting begins the more time the molders have for molding and the more molds they have to cast. For these reasons the work of casting is always put off until the latest hour that will give the molders time to get through casting, and get their castings all taken out of the sand and the sand wet and shoveled up before quitting time. In all large stove foundries each molder is provided with a ladle and shank for pouring off his molds. The molders are divided up into casting sections, with from 10 to 30 or 40 men in a section, according to the capacity of the cupola. When casting, only one section is allowed to catch or pour at a time. This is done to avoid crowding and confusion around the cupola, and also to enable each molder to pour off all his molds without delay when he starts, so that he can have a red-hot ladle every catch after the first one, and thus avoid chilling the iron by catching in a cold ladle. When pouring, each section comes up in its turn, and as fast as one gets done another comes up, and so on until all the molds are poured off. As the section that pours off first generally gets a little the best iron and is the first to get its castings out and go home, the sections are changed every day, so that the section that is first one day is last the next day, and every molder has an equal chance to get the best iron or get through with his work first and go home. In most stove foundries the time for putting the blast upon the cupola is from two to three o'clock p. m., and the time required for casting is from one to three or four hours, according to the size of the foundry or capacity of the cupola. After the blast has been on for 10 or 15 minutes the iron begins to melt, and the molten iron commences to run out at the tap hole, which is generally left open until the iron begins to melt and about a ladleful has run out. This is done in order to dry and warm up the spout and breast. The tap hole is then stopped with a bod, and a few ladles of molten iron are allowed to accumulate in the cupola to dry up the sand bottom and breast. This iron is then tapped out and caught in hand ladles, and is poured from one ladle to another to warm them, and after all the ladles have been warmed with the iron it is poured into some heavy casting, provided it is not too dull. If it is too dull to run a casting, it is poured into the pig bed. Enough molten iron is then allowed to accumulate in the cupola to give each molder in the first section a ladleful. The cupola is then tapped and the molten iron allowed to run out, and as it flows from the cupola it is caught in the ladles by the molders, and when each molder catches in he puts his ladle under the stream over the full ladle with a quick motion, that scarcely spills a drop of iron; the full ladle is then taken away and the ladle that is filling is set down, so as to give the next molder a chance to catch in over it when full. Each molder catches in this way, and carries his ladle off to his floor as soon as it is filled. This continues until the entire section has caught or the molten iron is all out of the cupola. The cupola is then shut up with a bod until the section have emptied their ladles and more molten iron has accumulated in the bottom of the cupola, when it is again tapped and the section given another ladleful all round, and this way of tapping and stopping is continued with each section until all the molds in the foundry are poured off. When carrying the molten iron from the cupola to the molds in hand ladles, the molder always carries his ladle to one side and behind him so as to avoid the heat of the molten iron upon his face and eyes, and also to make less risk of getting burned in case any of the molten iron is spilled while carrying it to the molds. As soon as a molder gets to the head of his floor he sets his ladle down, and takes the skimmer and skims off all the dirt and scum that has risen to the surface of the molten iron. It is then ready for pouring and is carried to the mold into which it is to be poured. When about to pour the iron into a gate the lip of the ladle is held a little to one side of the gate, so that when tipped it will throw the stream of molten iron from the ladle directly into the gate, and if the gate is a flat one the stream is always made to strike upon the side of the gate next the ladle, so as to break the fall of the iron and make less risk of breaking down the sharp points of sand at the bottom of the gate; but if the gate is a round one the stream is generally thrown directly into it, for in this case the heel of the spew breaks the fall, and the more directly the molten iron is poured into a round gate the less risk there is of not running the casting. When about to pour a mold, the molder rests the side of the shank against his leg, so as to hold the ladle perfectly steady while pouring. He then tips the ladle with the hand on the end of the shank, so as to pour a heavy or light stream of metal from the ladle, to suit the gate and the mold that is being poured. When first starting to pour a gate, the stream from the ladle is always started light, and is increased after the gate

has been partly filled, and a steady stream that will keep the gate full is then poured from the ladle until there is enough metal in the gate to fill the mold. The pouring is then stopped to avoid wasting the iron and straining the mold, and as fast as one gate is poured the molder moves on to the next one and repeats the same operation until the ladle is emptied, or so near empty that there is not enough iron in it to fill another mold. The molder then returns to the cupola for another ladleful of iron. If the iron is very hot and fluid, any little drops of iron that are left in the ladle after pouring are kept in it; but if the iron, as it comes from the cupola, is a little dull, the little drops left in the ladle after pouring are always thrown in the pig bed. None but the hottest and most fluid of molten iron can be used for pouring light stove plates. All the small or heavy pieces are poured with one ladle, and pieces that are so light or are of such a shape that the molten iron cannot be poured into the mold through one gate fast enough to fill the mold and form the casting before the molten iron is robbed of its fluidity by the cold, damp sand, are always arranged with two or more gates and are poured from two or more ladles at the same time. When pouring any piece that requires more than one ladle to pour it, it is very important that all the ladles should be started to pour at the same time and all stopped at the same time, for if one ladle is started to pour before the others are, it may shoot the molten iron into a part of the mold that it cannot fill, and will interfere with the iron flowing properly from the other gates to fill the mold. In many cases where four ladles are used for pouring one mold, if one ladle is started to pour a few seconds before the others it will spoil the casting, and if one ladle is stopped from pouring before there is enough iron in the gates to fill the mold, it will generally spoil the casting, for there will be no pressure of iron in the gate to keep up the flow of the iron in the mold. The instant that molten iron ceases to flow in a mold, the damp sand chills it so that the mold cannot be filled from that gate or any of the other three gates. In pouring a mold with one or more gates, the most important point is to start pouring slowly, so as not to break down the gates, and to give the molten iron a chance to start to flow from the gate. The next important point is to pour a steady and continuous stream, that will keep the gate full and keep up an even and uninterrupted flow of the iron from the gate to all parts of the mold, from the time the pouring is commenced until the mold is filled. Another important point is to stop pouring at the proper time, so as to run the casting and not strain the mold. These three points constitute all the important principles of pouring stove plate, and to learn them properly requires long practical experience.

After the molds have been poured and the molten iron has had time to set, the next thing in order is to take out the castings, and as soon as the molder finishes pouring, or, if he has time between ladles, he knocks the clamps off the flasks that are poured and lays them upon the top of the flask. He begins at one end of his floor and lays the clamps of the first flask upon the floor. He then shakes the sand and casting out of the flask and sets it on end or lays it down near the clamps. The bottom board is then turned up so as to turn the sand and casting into a heap, and the bottom board is laid on the flask and laid on top of the flask that has been shaken out. The next flask is then shaken out and the bottom board turned up the same as with the first flask, and so on until all the flasks have been shaken out and piled or set up out of the way and the sand shoveled up from the floor. The molder then takes his hammer and pincers and lifts each piece of casting from the sand and raps it lightly with the hammer to jar the loose sand from it. The casting is then laid down on the floor or upon the side of the sand heap to cool while the other castings are being lifted from the sand and rapped. After all have been lifted from the sand heap and had the loose sand rapped from them, they are carried to the end of the floor nearest the gangway, where the gates are broken off each casting. Any little fins that may have been formed upon the edges of the castings at the parting line by the straining of the mold are all trimmed off with the hammer. The castings are then piled up on the end of the floor or in the gangway. This ends the molder's work with them. They are next taken in charge by the casting wheelers, who wheel them into the cleaning room to be cleaned, and wheel all the gates and scrap to the rattle barrels or upon the cupola scaffold to be remelted next heat. The gangway cleaners clean up all the parting sand and dirt from the castings and get the gangways ready for the next heat.

Cement for Labels.—1. Macerate 5 parts of glue in 18 parts of water. Boil and add 9 parts rock candy and 5 parts gum arabic. 2. Mix dextrine with water and add a drop or two of glycerine. 3. A mixture of 1 part of dry chloride of calcium, or 2 parts of the same salt in the crystallized form, and 36 parts of gum arabic, dissolved in water to a proper consistency, forms a mucilage which holds well, does not crack by drying, and yet does not attract sufficient moisture from the air to become wet in damp weather. 4. For attaching labels to tin and other bright metallic surfaces, first rub the surface with a mixture of muriatic acid and alcohol; then apply the label with a very thin coating of the paste, and it will adhere almost as well as on glass. 5. To make cement for attaching labels to metals, take 10 parts tragacanth mucilage, 10 parts of honey and 1 part flour. The flour appears to hasten the drying and renders it less susceptible to damp. Another cement that will resist the damp still better, but will not adhere if the surface is greasy, is made by boiling together 2 parts shellac, 1 part borax and 16 parts water. Flour paste, to which a certain proportion of nitric acid has been added, and heat applied, makes a lasting cement, but the acid often acts upon the metals. The acid converts the starch into dextrine.

Iron.
NEW YORK.
OGDEN & WALLACE,
85, 87, 89 & 91 Elm St., New York.
Iron and Steel
Of every description kept in stock.
Agents for Park & Brother & Co.'s
BLACK DIAMOND STEEL.
All sizes of Cast and Machinery Steel constantly on hand.

PIERSON & CO.,
24 Broadway, New York City.
Iron & Steel.
COMMON & REFINED IRON,
Hoops, Rods, Scrolls, Bands, Ovals,
Horse Shoe, Nail Rods,
Steel, &c.
Orders promptly filled from stock.

ABEEL BROTHERS,
Established 1766 by ABEEL & BYVANCK.
Iron Merchants,
190 South Street and 365 Water, N. Y.
ULSTER IRON
A full assortment of all sizes constantly on hand.
Refined Iron,
Horse-Shoe Iron,
Common Iron,
Band, Hoop and Scroll Iron,
Sheet Iron,
Norway Nail Rods,
Norway Shapes,
Cast, Spring and Tire Steel, etc.

A. R. WHITNEY,
Manufacturer of and Dealer in
IRON
Our specialty is in
Manufacturing Iron Used in the Con-
struction of Fire-Proof Buildings,
Bridges, &c.
Agent for
Carnegie Bros. & Co., Limited, Pittsburgh,
Pa., Wrought Iron Beams and
Channel Iron.
Bay State Iron Co., Boston, Mass., Boiler
Plate and Tank Iron.
Naylor & Co., Boston, Mass., Homogeneous
Steel Plates and Compressed Steel
Shafting.
Plans and estimates furnished, and contracts
made for erecting Iron Structures of every descrip-
tion. Books containing cuts of all Iron made sent
on application by mail.
Sample pieces at office. Please address
58 Hudson Street, New York.

BORDEN & LOVELL,
Commission Merchants
70 & 71 West St.,
New York.
Wm. Borden,
L. N. Lovell,
Agents for the sale of

Fall River Iron Co.'s Nails,
Bands, Hoops & Rods.
AND
Borden Mining Company's
Cumberland Coals.

WILLIAM H. WALLACE & CO.,
IRON MERCHANTS
Cor. Albany & Washington Sts.,
NEW YORK CITY.
W. H. WALLACE. Wm. Bispham.

B. F. JUDSON,
Importer of and Dealer in
SCOTCH AND AMERICAN
Pig Iron,
Wrought & Cast Scrap Iron,
OLD METALS.
457 & 459 Water St.,
233 & 235 South St.,
NEW YORK.

DANIEL F. COONEY,
(Late of and Successor to Jas. H. Hoidane & Co.)
88 Washington St., N. Y.
BOILER PLATES and SHEET IRON,
LAP WELDED BOILER FLUES,
Boiler Rivets, Angle & T Iron, Cut Nails & Spikes.
Agency for Pottstown Iron Co., Vindict Iron Works,
Lebanon Rolling Mills, Pine Iron Works, Laurel Iron
Works, The Bergen Rolling Mills at Jersey City, Glas-
gow Iron Co.

SWEDISH IRON.
J. F. FULLARTON,
Bennett Building,
NEW YORK,
Representing
L. G. BRATT & CO. and the UDDEHOLM CO., Sweden.
Importing BESSEMER and SIEMENS-MAR-
TIN PRODUCTIONS, RAILS, BLOOMS and
OLD MATERIALS.

Powerville Rolling Mill,
Manufacturer of
HORSE SHOE IRON
JOHN J. CONARD, 450 West St., N. Y.

Iron.
NEW YORK.
A. B. Warner & Son,
IRON MERCHANTS,
28 & 29 West and 52 Washington Sts.
BOILER PLATE,
Boiler Tubes, Angle, Tee & Girder Iron,
Boiler and Tank Rivets.
Sole Agents for the celebrated
"Eureka," Pennocks,
"Wawasset," Lukens,
Brands of Iron. Also all descriptions of Plate, Sheet,
and Gasometer Iron. Special attention to Locomotive
Iron. Fire Box Iron a specialty.

ROME MERCHANT IRON MILLS,
ROME, N. Y.,
Manufacturers of the best grade of
Bar Iron, Bands and Fine Hoops.
Scrolls, Ovals, Half Ovals, Half Rounds, Hexagon and
Horse Shoe Iron. Also from Charcoal Pig a superior
quality of iron branded J. G. All puddled balls re-
duced by hammer. Orders may be sent to the Mill or
to J. O. CARPENTER, our Agent, at 59 John
Street, New York.

ALLSTON GERRY & CO.
IRON AND METAL BROKERS
NO 68 WALL ST. NEW YORK
IRON AND STEEL RAILS, OLD RAILS.
* SCRAP AND PIG IRON.

FOX & DRUMMOND,
Brokers in
IRON,
TIN PLATES
& METALS,
68 Wall St., New York.

JAMES WILLIAMSON & CO.,
SCOTCH AND AMERICAN
PIG IRON,
No. 69 Wall St., New York.

ULSTER IRON WORKS.
90 Broadway, New York.

Tuckerman, Mulligan & Co
CARMICHAEL & EMMENS
130, 132 & 134 Cedar St., New York.
DEALERS IN
IRON AND STEEL BOILER PLATE.
Lap-Welded Boiler Tubes, &c., &c.
Agent for Otis' celebrated Cast Steel Boiler Plates,
The Coatesville Iron Co., Pottstown Iron Co., The
Laurel Rolling Mills, and Union Tube Works; Wrought
Iron Beams, Angles, Tees, Rivets, &c.

HUGH W. ADAMS & CO.,
IMPORTERS OF
SCOTCH AND ENGLISH IRONS,
Agents for American Charcoal and Anthracite Furnaces,
56 Pine Street, New York.
HUGH W. ADAMS. DANIEL L. COBB.

W. S. MIDDLETON,
Broker in Machinery & Iron
Agent for
FORSTER'S CRUSHER & PULVERIZER,
The best in market.
W. S. MIDDLETON, 52 John St., N. Y.

S. A. LISSBERGER,
IRON & METAL DEALER,
509, 511 and 513 to 515 East 10th St., New York,
have on hand, and offer for sale, the following:
Scotch and American Pig Iron, Wrought, Cast
and Machinery Scrap Iron, Car Wheels, Axles and
Heavy Wrought Iron; also, old Copper, Composi-
tion, Brass, Lead, Pewter, Zinc, &c.

DANIEL W. RICHARDS & CO.,
FOREIGN AND DOMESTIC
SCRAP IRON, STEEL, RAILS AND METALS,
Yards and Office, 88 to 96 Mangin St., NEW YORK.
DANIEL W. RICHARDS. MORTON B. SMITH.

PASSAIC ROLLING MILL CO.,
Manufacture and have always in stock
ROLLED IRON BEAMS,
Channels, Angles, Tees, Merchant Bars, Riveted Work, For-
gings, Eye Bars, &c.
PATERSON, N. J.
Room 45, Astor House, New York.

CUT NAILS
Hot Pressed Nuts, Bolts, Washers, &c.
FULLER BROTHERS & CO.,
130 Greenwich Street, New York.

Iron.
NEW YORK.
JOHN W. QUINCY & CO.,
98 William Street, New York.
Anthracite & Charcoal Pig Irons,
Wrought Scrap, Cut Nails, Copper,
BLOCK TIN, LEAD, SPELTER, ANTIMONY, NICKEL, &c.

HARRISON & GILLOON
IRON AND METAL DEALERS,
558, 560, 562 WATER ST., and 302, 304, 306 CHERRY ST.,
NEW YORK,
have on hand, and offer for sale, the following:
Scotch and American Pig Iron, Wrought, Cast and
Machinery Scrap Iron, Car Wheels, Axles and Heavy
Wrought Iron; also old Copper, Composition, Brass,
Lead, Pewter, Zinc, &c.

OXFORD IRON CO.,
(B. G. CLARKE, Receiver.)
Cut Nails
AND
SPIKES.

J. S. SCRANTON, Sales Agent,
81, 83 and 85 Washington Street,
NEW YORK.

BURDEN'S
HORSE SHOES.

"Burden Best"
Iron

Boiler Rivets.

The Burden Iron Company
Troy, N. Y.

ULSTER
AND
BURDEN'S
H. B. & S. Bar Iron.
Also Best Grades of

American & English Refined Iron.
All sizes and shapes in stock.

EGLESTON BROS. & CO.,
166 South St.,
267 Front St.,
NEW YORK CITY.

Glengarnock and Carnbroe
SCOTCH PIG IRON.

For spot delivery and for prompt or forward
shipments to New York, Boston, Philadelphia,
Baltimore or New Orleans.

For sale in lots to suit by
JAMES LEE & CO.,
Sole Agents for the United States,
72 Pine Street, New York.

BATES & DESPARD,
117 Pearl St., New York, P. O. Box 764,
Importers of
STEEL AND IRON RAILS, SWEDISH
BAR, STEEL and PIG IRON.
SCRAP IRON an OLD RAILS c. f. and i. to
American, or f. o. b. English ports.

Iron.
PITTSBURGH.

W. D. WOOD & CO.'S



PATENT
Planished Sheet Iron.

Patented March 14th, 1865; April 8th, 1873;
Sept. 9th, 1873; Oct. 6th, 1874; Jan. 11, 1876.

Guaranteed fully equal in all respects to the
IMPORTED RUSSIA IRON,
and at a much less price.

FOR SALE,
by all the principal

METAL DEALERS

In the Large cities throughout

THE UNITED STATES.

And at their Office,
111 Water Street, PITTSBURGH, PA.

C. KANE,
OLD RAILS, SCRAP IRON, STEEL,
PIG IRON, BLOOMS,
AND ORE.
PITTSBURGH, PA.

WM. REA, Pres. SAML. BAILEY, Jr., Secy.
F. B. LAUGHLIN, Vice-Prest. W. A. SHAW, Treas.

UNION STORAGE CO.

RECEIVE ON

Storage and Issue Warrants

ON

PIG IRON, BLOOMS, INGOTS,

MUCK BAR, RAILS, &c.

Correspondence relative to establishment of
yards at furnaces solicited.

General Office, PITTSBURGH, PA.

Sable Iron and Nail Works.

ZUC & CO.,

Manufacturers of the Celebrated

Sable Nails

Office and Works,

PITTSBURGH, PA.

LEECHBURG IRON WORKS.

KIRKPATRICK & CO.,

Manufacturers of all grades of

FINE SHEET IRONS,

(Refined, Cold Rolled, Show Card, Stamping, Tea Tray, Polished, Shovel, Ferrule Iron, &c.)

NATURAL GAS USED AS FUEL.

OFFICE, No. 143 First Ave., Pittsburgh, Pa. WORKS, Leechburg, Pa.

MARSHALL LEFFERTS & CO.,

90 Beekman St., New York City,
MANUFACTURER AND DEALER.

Galvanized Sheet Iron,

1st and 2d Qualities.

Galvanized Wire, Telegraph and Fence; Galvanized
Hoop and Band Iron, Galvanized Rod and Bar Iron,
Galvanized Nails, Galvanized Chain, Galvanized Iron
Pipe.

CORRUGATED SHEET IRON

For Roofing, &c., Galvanized, Plain or Painted.

Best Charcoal, Best Refined and Common

SHEET IRON.

Plate and Tank Iron,

C No. 1, C H No. 1, C H No. 1 Flange, Best Flange
Best Flange Fire Box, Circles.

BOILER IRON

Stamped and Guaranteed.

All descriptions of Iron Work Galvanized or
Tinned to order.

Price list and quotations sent upon application.

Iron.
PITTSBURGH.

JUNIATA



STEEL TOE CALKS.

Extra Quality Homogeneous Steel

BOILER PLATE

STEEL PLATES, all descriptions.

Cut Nails and Spikes, Plate and Sheet

Iron, all descriptions.

SHOENBERGER & CO., Pittsburgh, Pa.

KEYSTONE ROLLING MILL.

WILLIAMS, LONG & McDOWELL

Manufacturers of

IRON,

Pittsburgh, Pa.

Bonnell, Botsford & Co.,

Iron, Nails & Spikes.

YOUNGSTOWN, OHIO.

PORT ORAM MANUFACTURING CO.

Manufacturers of

Scrap & Pig Iron Blooms

From Selected Stock, Hammered under Steam Hammer.

Port Oram, Morris County, New Jersey.

Iron.

PHILADELPHIA.

**Siemens' Regenerative
GAS FURNACE.**
RICHMOND & POTTS,
119 S. Fourth St. PHILADELPHIA, PA.

Iron.

PHILADELPHIA.

**HENRY LEVIS & CO.,
Manufacturers' Agents**
For Iron and Steel Rails, Car Wheels, Boiler and
Sheet Iron and General Railway
Equipments.
Old Rails, Axles, and Wheels bought and sold.
234 S. 4th St., Philadelphia.

The Cambria Iron and Steel Works,
Having enjoyed for over TWENTY-FIVE YEARS the reputation of producing the best quality of
RAILS,

150,000 Tons of Iron and Steel Rails, Splice Bars, &c.

ADDRESS,
CAMBRIA IRON COMPANY,
No. 218 South 4th Street, Philadelphia.

Or at the Works, JOHNSTOWN, PA.

Or LENOX SMITH, New York Selling Agent, 46 Pine St., N. Y.

THE PHOENIX IRON CO.,
410 Walnut Street, PHILADELPHIA.
Manufacturers of Wrought Iron

Beams, Deck Beams, Channels, Angle & Tee Bars,
STRAIGHT AND CURVED TO TEMPLATE,
Largely used in the construction of Iron Vessels, Buildings and Bridges.
WROUGHT IRON ROOF TRUSSES, GIRDERS & JOISTS,
and all kinds of Iron Framing used in the construction of Fire Proof Buildings.
PATENT WROUGHT IRON COLUMNS, WELDLESS EYE BARS,
and built up shapes for Iron Bridges.
REFINED BAR, SHAFING, and every variety of SHAPE IRON made to order.
Plans and Specifications furnished. Address **DAVID REEVES, President.**
NEW YORK AGENTS, **MILLIKEN & SMITH,** 93 Liberty Street.
BOSTON AGENTS, **FRED. A. HOULETTE & CO.,** 19 Battery March St.

ALAN WOOD & CO.,
MANUFACTURERS OF

Patent Planished, Galvanized, Common, Best Refined, Cleaned and Charcoal Bloom
PLATE & SHEET IRON.
No. 519 Arch St., Philadelphia, Pa.

Orders solicited especially for Corrugated, Gasholder, Pan and Elbow, Water Pipe, Smoke Stack, Tank and Boat Iron; Last, Stamping, Ferrule, Locomotive Headlight and Jacket Iron.

NAILS
JAS. ROWLAND & CO.,
Kensington Iron, Steel & Nail Works,
920 North Delaware Ave., - - PHILADELPHIA,
Manufacturers of the
Anvil Brand Refined Merchant Bar Iron.
Also, the James Rowland & Co. Kensington Nails, cut from their
Refined Anvil stock. Also, Plow and Cultivator Steel, Rounds,
Squares, Flats, Bands and Hoop Iron.
Correspondence with Dealers solicited.

PENCOYD IRON WORKS.

A. & P. ROBERTS & CO.,
Manufacturers of
CAR AXLES.
BAR, ANGLE, TEE AND CHANNEL IRON.
Office, No. 365 S. Fourth St., Philadelphia. Agents for the sale of Glamorgan Pig Iron.

MANUFACTURERS OF
FOUNDRY FACINGS.
AND
FOUNDRY SUPPLIES.

MOULDING SAND
A SPECIALTY.

Albany, Crescent, Tullytown and Lumberton Sands.

**GERMAN LEAD, BITUMEN, SIEVES, MACHINERY SAND,
AMERICAN LEAD, ANTHRACITE, SHOVELS, BRASS SAND,
PLUMBAGO, CHARCOAL, BRUSHES, CHANDELIER SAND,
TOVE PLATE, MINERAL, CRUCIBLES, STOVE PLATE SAND,**

J. W. PAXSON & CO., Office and Storeroom: 514, 516 and 518 Beach St., PHILADELPHIA, PA.

ALLENTOWN ROLLING MILL COMPANY,
Manufacturers of

Rails, Bars, Axles, Shafting, Fish Bars (Plain and Angle), Spikes,
Rivets, Bolts and Nuts, &c. Bridges and Turn Tables.
General Office, 377 South Third St., Philadelphia. Works at Allentown, Pa.

JAMES C. BOOTH.

THOMAS H. GARRETT.

ANDREW A. BLAIR.

BOOTH, GARRETT & BLAIR,
Analytical and Consulting Chemists,
919 and 921 Chant St. (10th St. above Chestnut St.), PHILADELPHIA, PA.
Established in 1836.

Analyses of Ores, Waters, Metals and Alloys of all kinds. A special department for the
ANALYSIS OF IRON AND STEEL,

with all the apparatus and appliances for the rapid and accurate analysis of Iron Steel, Iron
Slags, Limestones, Coals, Clays, Fire Sands, &c. Agents for sampling ores in New York and
Sore. Price lists on application.

Iron.

Edward J. Etting,
IRON BROKER AND COMMISSION MERCHANT,
230 S. Third St., Philadelphia, Pa.
Pig, Bar and Railroad Iron.
OLD RAILS, SCRAP, &c.
Agent for the

MOUNT SAVAGE FIRE BRICK,
The Allentown Iron Co. and
The Coleraine Furnaces.
STORAGE WHARF AND YARD
DELAWARE AVENUE ABOVE CALLOWHILL STREET,
connected by track with railroad.
Cash advances made on Iron.

J. Wesley Pullman,
407 Walnut St., Philadelphia,
Exclusive SALES AGENT
**Chester Iron Co.'s Blue, Red and Hoff
ORES.**
Also celebrated "Brotherhood" Ore.

T. HORACE BROWN. D. W. R. READ.
D. W. R. READ & CO.,
Dealers and Commission Merchants in

ORES, METALS, &c.
Native and Foreign Iron, Manganese,
and other Ores.
205½ Walnut St., PHILADELPHIA.
Office in New York, 143 Pearl St.
Office in Baltimore, 67 S. Gay St.
Office in London, 57 Gracechurch St.

J. O. RICHARDSON,
IRON COMMISSION MERCHANT,
No. 233 Dock St., Philadelphia.
**Pig Iron, Railroad Iron and
Iron Ores.**
Sole Agent for the MONOCACY FURNACE CO.
DEALER IN

MOSELEM, ROCKHILL, WARWICK,
And other Favorite Brands.
SILVER GREY IRON A SPECIALTY.
J. W. HOFFMAN & CO.,
Iron Merchants & Railway Equipments.
208 South Fourth St., Philadelphia.

Sole agents Glasgow Iron Co. and Pine Iron Works
manufacturers of Muck Bar and all grades of Plate
Iron. Celebrated "Glasgow" and "Pine"
brands for fire boxes and difficult flanging. Pig and
Bar Iron, Rails and all shapes in Iron. Quotations
given on Bridge and Building Specifications.

WROUGHT IRON
Boiler Tubes,
Steam, Gas and Water Pipe.
Oil Well Tubing, Casing and
LINE PIPE.
Cotton Presses, Forgings,
**ROLLING MILL AND
General Machinery.**

READING IRON WORKS,
261 S. Fourth St., Philadelphia.
G. A. HEBERTON. S. FRANK SHARPLES.
HEBERTON & CO.,
Selling Agents and Commission Merchants
For the sale of
**Pig, Bloom, Plate, Bar, Scrap, Galvanized,
Black, Sheet, Pipe and Railroad
IRON.**
No. 333 Walnut St., Phila.
Charcoal Bloom and Pig a specialty.

IRON. STEEL.
SCRAP OF ALL KINDS A SPECIALTY.
First Quality Muck Bars.
SHIMER & CO.,
Late of and successors to W. HUTTON & CO.,
250 S. Third St., Philadelphia.

J. J. MOHR,
Iron Commission
Merchant,
No. 430 Walnut Street, Philadelphia.
Sole Agent for the Sheridan and Leesport Furnaces.

A. PURVES & SON,
Corner South & Penn Streets, Phila.
Dealers in
Scrap Iron & Metals, Machinery, Tools,
Shafting & Pulleys, Steam Engines,
Pumps & Rollers, Copper, Brass,
Tin, Babbit Metals, Foundry
Facings. Best Quality Ingot Brass.
Cash paid for all kinds of Metals and Tools.

FRANCIS WISTER,
Sole Eastern Agent for
A. A. HUTCHINSON & BRO.
CONNELLSVILLE COKE.
ORES, Native and Foreign.
230 South Third Street, Philadelphia.

J. F. BAILEY & CO.,
216 South 4th St., Philadelphia. 52 Wall St., (Room 8) New York.
Selling Agents
ATKINS BROS.—BEAMS, CHANNELS, RAILS, &c.
**A. & P. Roberts & Co.—Car Axles, Plates, Channels, Tee,
Angle and Bar Iron.**
WILLIAM McILVAIN & SONS—Boiler, Ship and Bridge Plates.
BERWICK R. M. BARS AND SHAPE IRON.
Advances on Consignments of Old Material and sales promptly made.

CHAINS.
Dredging, Mining and Crane Chains, Raising Chains, Toggles, Eye Bolts and Log Dogs.
We wish to call particular attention to our D. B. G. special Crane Chain, made of an extra
brand of reworked iron, exhibiting great tensile strength and wear, fully tested and warranted
to be of the very best workmanship and material; superior to the very best brands of English
Crown Chain, and specially adapted for raising, mining and dredging.

Iron.

JUSTICE COX, JR. CHARLES K. BARNES.
JUSTICE COX, JR. & CO.,
AGENTS FOR

**CHICKIES, ST. CHARLES, MONTGOMERY
WARWICK, CONEWAGO AND KEYSTONE
Foundry & Forge Pig Iron.**
SHAWNEE ROLLING MILL CO., Limited,
Best Quality Muck Bar.
CATASAUQUA MFG. CO.'S
Bar, Angle, Skelp and Sheet Iron.
Railroad Car Axles. New and Old Rails.
No. 333 Walnut St., Philadelphia.

PETER WRIGHT & SONS,
307 Walnut Street, Philadelphia,
19 Broadway, New York,
44 Second Street, Baltimore,
Importers of
German and English

SPIEGELEISEN,
Pig, Scrap,
NEW AND OLD RAILS,
And Iron Ore.

E. W. CLARK & Co.
Bankers and Stock Exchange Brokers,
No. 35 South Third St., Philadelphia.

CLARK, POST & MARTIN,
No. 34 Pine St., New York,
Bankers and Railway Commission Merchants,
Importers of
Pig Iron, New and Old Rails, Scrap Iron, &c.

**THE
STANDARD
STEEL
WORKS.**
LOCOMOTIVE AND CAR WHEEL TIRES,
Manufactured from the celebrated OTIS STEEL.
BRAND
STANDARD.
Quality and efficiency fully guaranteed. Prices as
low as any of the same quality. We manufacture
Heavy and Light Forgings, Driving and Car Axles,
Crack Pins, Piston Rods, &c.
Works at Lewistown, Pa.
Office, 220 S. 4th St., Philadelphia, Pa.

**Italian and Spanish
CHARCOAL IRON,
CHILL-GRADED,
For Car Wheels, &c.**
FOR SALE BY
ALFRED EARNSHAW,
203 Walnut Place, PHILADELPHIA.

LANGHORNE WISTER. RODMAN WISTER.
L. & R. WISTER,
IRON BROKERS.
Agents for the Clearfield Fire Brick Co.'s
Fire Bricks.
No. 230 South 4th St., Philadelphia.

KEYSTONE HORSE SHOE CO.,
816 Richmond St., Philadelphia, Pa.
Manufacturers of the Keystone Patent Solid
Steel Calk Horse and Mule Shoes.
These Shoes are made of superior iron and steel,
completely finished and ready for cold shoeing;
have clip and solid steel can. The holes are
punched through at the proper angles and free
from burrs. Same number of Shoes per keg as in
kegs of unfinished shoes.

SHOE.
PATENT
SOLID STEEL
CALK
HORSE & MULE
SHOE.

KEYSTONE HORSE SHOE CO.,
816 Richmond St., Philadelphia, Pa.
Manufacturers of the Keystone Patent Solid
Steel Calk Horse and Mule Shoes.
These Shoes are made of superior iron and steel,
completely finished and ready for cold shoeing;
have clip and solid steel can. The holes are
punched through at the proper angles and free
from burrs. Same number of Shoes per keg as in
kegs of unfinished shoes.

KEYSTONE HORSE SHOE CO.,
816 Richmond St., Philadelphia, Pa.
Manufacturers of the Keystone Patent Solid
Steel Calk Horse and Mule Shoes.
These Shoes are made of superior iron and steel,
completely finished and ready for cold shoeing;
have clip and solid steel can. The holes are
punched through at the proper angles and free
from burrs. Same number of Shoes per keg as in
kegs of unfinished shoes.

KEYSTONE HORSE SHOE CO.,
816 Richmond St., Philadelphia, Pa.
Manufacturers of the Keystone Patent Solid
Steel Calk Horse and Mule Shoes.
These Shoes are made of superior iron and steel,
completely finished and ready for cold shoeing;
have clip and solid steel can. The holes are
punched through at the proper angles and free
from burrs. Same number of Shoes per keg as in
kegs of unfinished shoes.

KEYSTONE HORSE SHOE CO.,
816 Richmond St., Philadelphia, Pa.
Manufacturers of the Keystone Patent Solid
Steel Calk Horse and Mule Shoes.
These Shoes are made of superior iron and steel,
completely finished and ready for cold shoeing;
have clip and solid steel can. The holes are
punched through at the proper angles and free
from burrs. Same number of Shoes per keg as in
kegs of unfinished shoes.

KEYSTONE HORSE SHOE CO.,
816 Richmond St., Philadelphia, Pa.
Manufacturers of the Keystone Patent Solid
Steel Calk Horse and Mule Shoes.
These Shoes are made of superior iron and steel,
completely finished and ready for cold shoeing;
have clip and solid steel can. The holes are
punched through at the proper angles and free
from burrs. Same number of Shoes per keg as in
kegs of unfinished shoes.

KEYSTONE HORSE SHOE CO.,
816 Richmond St., Philadelphia, Pa.
Manufacturers of the Keystone Patent Solid
Steel Calk Horse and Mule Shoes.
These Shoes are made of superior iron and steel,
completely finished and ready for cold shoeing;
have clip and solid steel can. The holes are
punched through at the proper angles and free
from burrs. Same number of Shoes per keg as in
kegs of unfinished shoes.

The Channel Tunnel.

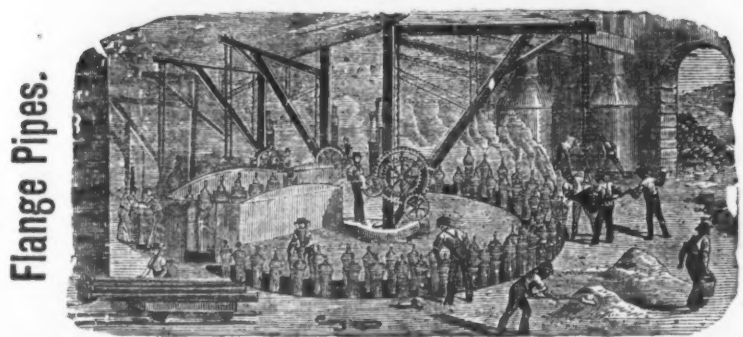
The tunnel proposed to be constructed between the English and French coasts cannot be said to have attracted much public attention as yet, but statements recently made, would seem to show that the project is not unlikely to be pushed forward. Whether it will ever be completed and used as a highway between this country and the Continent is somewhat open to doubt, yet it is not to be denied that the scheme is in the hands of men who know what they are about. Sir Edward Watkin, chairman of the South Eastern Railway Company, and many other railway and other undertakings—a sort of Commodore Vanderbilt in fact, but minus the Commodore's great wealth—appears to be boss of the idea, and seems to have fixed his gaze upon some definite object. It may be, perhaps, that Sir Edward is merely trying this business to force the hands of some of the other Southern lines in respect of certain routes to the Continent which run the Southeastern rather closely, but so far as can at present be ascertained, he is honestly and sincerely determined to make the tunnel. At a private meeting the other day Sir Edward unbosomed himself to a patient audience to the following effect on this subject:

"The whole question divided itself into two parts. One was whether they could pass under the channel through a stratum which was impervious to water. The second point was whether, by the aid of machinery, they could shorten very considerably the probable time of construction. What they had done was this: They had sunk two shafts on this side of the channel—one at the Abbott's Cliff Tunnel and the other on this side of the Shakspeare Cliff Tunnel. From the first of these shafts they had driven a gallery of from 800 to 900 yards, of a diameter of 7 feet, which had all been excavated by machinery. Last week, with that machinery, which was not perfect, they excavated 67 yards of lineal distance on the extension of that gallery. If that were the maximum speed each week, it meant about two miles of progress a year. Of course, as they worked from two ends, and as the distance was only 20 miles, practically speaking, it meant five years to complete a gallery 7 feet in diameter, as an experiment, under the whole length of the channel. As to the second shaft, at the Shakspeare Cliff, they had sunk that down to a depth of 155 feet. They had also bored from the bottom of the shaft to a further depth of 106 feet. They had found no trace whatever of water in the old gray chalk. There was a small quantity of water near the surface, but this was always expected. He therefore thought that solved the great questions of speed at which they could go and of the impermeability of the strata to leakages of water. On the other side of the channel the French company had sunk two very important shafts, and they had found exactly the same results as had been ascertained on this side. As to the machinery, they were on the eve of concluding another arrangement with Captain English, Colonel Beaumont, and M. Pigou, the proprietors of the machine with which they had been working. Under this new arrangement they would pay merely for the use of the machine, and by means of it they would carry those experiments considerably further (applause). It had been arranged between the French and English committees that they should drive through a heading of a further length of one mile on each side. When these two miles were finished—and they certainly ought to be in six months—one-tenth of the question was dealt with. If that were successful he should, he thought, propose a further treaty with the French gentlemen under which the remaining nine miles on each side would be done, and they would meet in the middle of the channel. If they were successful, the whole question was practically settled. Until the matter was proved, however, neither the French nor British investor would be asked to embark capital in the undertaking. The Southeastern shareholders were, as it were, the founders of the feast. They had taken all the risk, and they had authorized an expenditure of not more than £20,000 upon the affair. Now, a great deal of that which they wanted to prove had been proved. He meant to ask them to consider how best to make what had been proved more positive, and then to consider whether they should not get up a small limited liability company, or other company, to take the matter in hand without further interfering with the finances of the Southeastern Company. This was a question deserving serious consideration at their hands. They must, however, never forget that it was absolutely essential that this tunnel matter should remain under Southeastern control."

Should this tunnel ever be completed it would undoubtedly rank as the greatest engineering achievement of the century. The distance between the two trial points is about 22 English miles, and the depth of water varies from 50 to 250 feet in the channel. It is conceivable that the tunnel may be bored—although that is a tremendous task—but it is not easy to imagine how its regular working and ventilation is to be achieved. The use of compressed air engines instead of steam locomotives might assist in ventilating the tunnel, but as matters now stand, I fancy the public would prefer the 1½ hours sea journey and a possible taste of sea sickness to half or three quarters of an hour's imprisonment in darkness and in an atmosphere which must be horribly close and vitiated.

From the reports of the Inspectors of Mines of Great Britain for 1880, it appears that the English and Scotch collieries produced 146,969,409 tons of coal, and the iron mines 1,938,539 tons of iron stone. There were employed in the mines, underground, 301,351 persons, and above ground, 93,552. Twenty-eight explosions of fire-damp caused 499 deaths, a very unusually heavy loss, that in the preceding year being only 184 for 35 explosions. Falls of rock killed 462 men, and in shafts 91 lost their lives, while through various causes 178 men were killed underground. On the surface 88 accidents terminated fatally, carrying the total loss for the year to 1315 lives.

A. H. McNEAL, BURLINGTON, N. J.



CAST IRON PIPES FOR WATER AND GAS.

ESTABLISHED IN 1848.

SINGER, NIMICK & CO., PITTSBURGH, PA.

MANUFACTURERS OF ALL KINDS OF

HAMMERED AND ROLLED

STEEL.

Warranted Equal to any Produced.

BEST REFINED TOOL CAST STEEL

For Edge and Turning Tools, Taps, Dies, Drills, Punches, Shear-Knives, Cold-Chisels and Machinists' Tools generally.

SAW PLATES

For Circular, Mulay, Mill, Gang, Drag, Pit and Cross-Cut Saws.

Sheet Steel

For Springs, Billet Web and Hand Saws, Shovels, Cotton Gin Saws, Stamping Cold, &c., &c.

SIEMENS-MARTIN (Open-Hearth) PLATE STEEL

For Boilers, Fire-Boxes, Smoke Stacks, Tanks, &c.

All our Plate and Sheet Steel being rolled by a Patented Improvement is unequalled for surface finish and exactness of gauge.

ROUND MACHINERY CAST STEEL

For Shafting, Spindles, Rollers, &c., &c.

File, Fork, Hoe, Rake, R. R. Frog, Toe-Calk, Sleigh-Shoe and Tire Steel, &c.; Cast and German Spring and Plov Steel.

"Iron Center" Cast Plov Steel. Finished Rolling Plov Coulters with Patent Screw Hubs attached.
"Soft Steel Center" Cast Plov Steel. Agricultural Steel cut to any pattern desired.
"Solid Soft Center" Cast Plov Steel. Steel Forgings made to order.Represented at 59 Beekman St., New York, and 417 Commerce St., Philadelphia, by
HOGAN & BURROWS, Gen'l Agents for Eastern and New England States.

THE MIDVALE STEEL COMPANY, CRUCIBLE AND OPEN-HEARTH STEEL.

TIRES and AXLES OF EVERY DESCRIPTION.

Tool, Machinery and Spring Steel
Castings and Forgings.

Works and Office, Nicetown, Philadelphia, Pa. Warehouse, 12 N. 5th St., Philadelphia, Pa.

STEEL FORGINGS Of all Descriptions.

Address orders to

THE PHILADELPHIA STEEL FORGE, Office, 315 Willings Alley, PHILADELPHIA, PA.

ESTABLISHED 1847.

A. WHITNEY & SONS, PHILADELPHIA,

CHILLED RAILROAD WHEELS

For every kind of service, including Street, Mine and Lumber Tramways. Wheels furnished in rough bored or on axle. Chilled castings made to order.

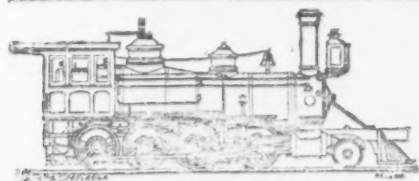
PENNSYLVANIA STEEL COMPANY, Steel Rails, Frogs, Crossings & Switches.

Forgings for Piston Rods, Guide Bars, Wrist Pins and Machinery Purposes.

Works at Baldwin Station, Pennsylvania Railroad, near Harrisburg, Pa.

Address all orders to

PENNSYLVANIA STEEL COMPANY, 208 South Fourth Street, Philadelphia.



BALDWIN LOCOMOTIVE WORKS, BURNHAM, PARRY, WILLIAMS & CO., Proprietors, Philadelphia, Pa., U. S. A., Manufacturers of

LOCOMOTIVE ENGINES of every Description.

Catalogues, photographs and estimates furnished on application of customers.

NOISELESS STEAM MOTORS, For city and suburban Railways.

These machines are nearly noiseless in operation; show no smoke with the use of anthracite coal or coke as fuel, and show no steam whatever under ordinary conditions of service. They can be run at two or three times the speed of horse cars and draw additional cars. Circulars with full particulars supplied.

ROANE IRON COMPANY,

Manufacturers of and Dealers in

Pig and Railroad Iron.

CHATTANOOGA, - - - - - TENN.

L. HERNSHEIM,

Importer and Commission Merchant,

105 John Street, NEW YORK.

NEW AND OLD STEEL AND IRON RAILS, STEEL RAIL BLOOMS, Bessemer and Spiegel Iron, Ferromanganese.

Sole Agent for the United States for the



STEEL AND IRON WIRE RODS

AND FOR THE

HUTTENBERG (AUSTRIA) IRON WORKS, CHARCOAL PIG IRON FOR CHILLED CAR WHEELS.

For the Siemens-Martin and Crucible Steel Manufacture.

EXTRA SOFT CHARCOAL STEEL BLOOMS, BILLETS AND RODS FOR COLD RIVETS, &c. Superior Drill, Sycite, Tool and Die Steel Manufactured from Charcoal Iron, &c., &c.

BRITTON IRON AND STEEL CO.,

MANUFACTURERS OF

IRON AND STEEL BOILER PLATE,

Tank, Bridge and Ship Plates,

BLACK AND GALVANIZED SHEET IRON.

Works foot of Wason St., cor. L. S. & M. S. R. R., CLEVELAND, O.

JACKSON IRON COMPANY,

Manufacturers of Fayette Pig Iron (L. S. Charcoal), Stewart Pig Iron (Bituminous Coal and Coke), Also, Hammered Blooms, Billets and Muck Bar, extra low in phosphorus, for Siemens-Martin and Crucible Steel. Mined of Jackson (Lake Superior) Iron Ores. FAYETTE BROWN, Gen. Agent. HARVEY H. BROWN, Asst. Gen. Agent. Offices, 130 Water St.

HARVEY H. BROWN & CO.,

AGENTS

CHAMPION IRON CO., LAKE SUPERIOR IRON CO. } Lake Superior Iron Ores.
Dealers in Pig Iron, Iron Ores and Old Rails.

Offices, 130 Water Street, - - - CLEVELAND, OHIO.

CHROME STEEL

For Sale by JOHN W. QUINCY & CO., 98 William St., N. Y.

Eighty cases of this Best Quality Cast Steel, to close a consignment, in quantities as required, at less than market rates, in Octagon, $\frac{1}{2}$, $\frac{3}{4}$, $1\frac{1}{2}$, $2\frac{1}{2}$, $3\frac{1}{2}$, $4\frac{1}{2}$ in.; Round Drill do., $\frac{1}{2}$, $\frac{3}{4}$, 1 , $1\frac{1}{2}$ in.; Square C. S., $\frac{1}{2}$, $\frac{3}{4}$, $1\frac{1}{2}$, $2\frac{1}{2}$, $3\frac{1}{2}$, $4\frac{1}{2}$ in.; Round (hammered then rolled), $\frac{1}{2}$, $\frac{3}{4}$, 1 , $1\frac{1}{2}$, 2 in.; Hexagon, $\frac{1}{2}$ to $2\frac{1}{2}$ in.; 75 bars Flat, $\frac{1}{2}$ x $\frac{1}{2}$ to $2\frac{1}{2}$ x $2\frac{1}{2}$ in. This Steel is all of best quality and will be sold low.

CHARLES HUBBARD, 46 Cliff St., New York City HEAVY STEEL AND IRON FORGINGS,

For Marine, Stationary and Locomotive Engines.

Homogeneous Steel Boiler Plate, "Nashua" Brand. Best YORKSHIRE BAR, "TAYLOR" IRON, for Stamped Work, Screws, etc., etc. HUSNET SPECIAL TOOL STEEL, requires neither tempering nor hardening. Estimates given.

Kelly Steel Barb Wire.



Patented in 1868, and fully licensed under all the bottom patents. Its WEIGHT IS ONE POUND TO THE ROD, and is a Fence for a Lifetime.

Is adopted by railroads, by stock raisers and by farmers generally, on account of its superior style of barb, giving STRENGTH AND LIGHTNESS, and always holds its sharp point. In the BARB WIRE LAW SUITS

a decision has been rendered sustaining all the Patents, and all manufacturers, dealers and users infringing will be held liable for damages.

We do not sell to jobbers, but want one reliable retail dealer in each town.

THORN WIRE HEDGE CO., 15 to 21 N. Clinton St., Chicago.

IRON AND STEEL DROP FORGINGS

All shapes, small and large, including Gun, Pistol, Wrench Bars, &c. Also, Die Sinking. Manufacturers also of Bricklayers', Moulders', and Plasterers' Tools, Saddlers' Round and Head Knives.

WILLIAM ROSE & BROS., 36th & Filbert Sts., West Philadelphia.

HOOPES & MERRY,

Manufacturers of

"LION" Brand or B. B.—"PHOENIX" Brand or Best Charcoal

GALVANIZED SHEET IRON,

539, 541, 543, 545 and 547 West Fifteenth Street, New York.

Corrugated Sheet Iron. Black or Galvanized. All kinds of Ironwork, Tinned or Galvanized.

PHILADELPHIA SMELTING COMPANY, Limited,

S. E. Cor. Twelfth and Noble Sts., PHILADELPHIA.

GENUINE BABBITT,

Guaranteed at a speed of 10,000 a minute, and at any pressure for 10 years.

DEOXIDIZED BRONZE,

Superior to Phosphor Bronze or any other alloy of Copper and Tin for Machinery Journals.

PHILADELPHIA, October 4, 1880. PHILADELPHIA SMELTING COMPANY, City.—GENTLEMEN: After a trial of eighteen months of your "Deoxidized Bronze" as journal boxes in our rolling mill, where great pressure is required, we take pleasure in recommending it as being superior to any we have heretofore used. Very truly, HENRY DASTON & SONS.

THE COMBINATION IRON CLAD STEEL HORSE SHOE CO., SELF WELDING STEEL TIRE CO., HILLET AND WIRE CO.,

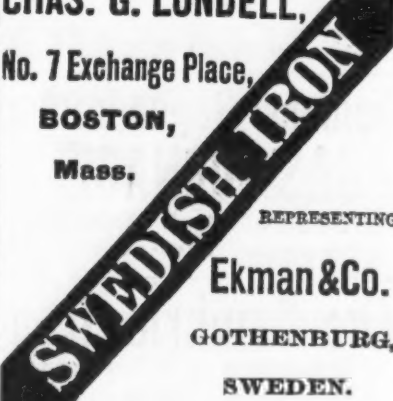
Sole and exclusive manufacturers of "Wheeler's Combination" Shoes, Shoe Bars and Toe Calks. Tire and Wire. Full particulars upon application by mail or otherwise to WALKER B. GAY, Treasurer, 66 State Street, Boston, Mass. All persons cautioned against infringement.

CHAS. G. LUNDELL,

No. 7 Exchange Place,

BOSTON,

Mass.



J. B. SHANNON & SONS,

1009 Market St., Phila.

Manufacturers of

ART METAL WORK,

Furniture Decoration
AND FINE CABINET LOCKS.

Catalogues Sent Free.

W. H. CARRUTHERS, Chairman, A. PLUMMER, Sec'y and Treasurer. WM. NEHRING, Superintendent.

QUEEN CITY MALLEABLE IRON CO., Limited,

Make all Shapes and Sizes of

Malleable Iron Castings

known to the trade. Our specialty is

WELDING MALLEABLE CASTINGS.

Guaranteed to weld perfectly and capable of being drawn under a hammer. Address, N. W. Cor. Vine and Second Sts., CINCINNATI.

Detroit Copper & Brass Rolling Mills.

BRAZIER'S AND SHEATHING COPPER,
ROLLED, SHEET & PLATERS' BRASS

GERMAN OR NICKEL SILVER,

Copper Wire for Electrical and other purposes.

Brass and German Silver Wire.

Copper Sheets and Bars.

COPPER BOTTOMS FOR TEA KETTLES AND BOILERS,
Cor. Larned & Fourth Sts., Detroit, Mich.

NORTH BROS.,

234 and Race St., Philadelphia.

Fine Light and Medium-Weight GRAY
IRON CASTINGS to order.
Correspondence solicited.

WM. PAULSEN,

P. O. Box 3708, NEW YORK.

METAL COMMISSION MERCHANT.

Sole Agent for the well-known SS brand of
Spelter and refined Stolberg Pig Lead.

MOSES GOLDSMITH & SON

Key Box 156,

CHARLESTON, S. C.

Wholesale dealers in
METALS, IRON, RAGS,
And all kinds of Paper Stock.
We invite correspondence.

P.W. Gallaudet & Co.

Cor. Broadway and Wall St., New York.
Bankers and dealers in COMMERCIAL PAPER.
Stocks and Bonds dealt in for cash or on margin.
New York Stock Exchange.

S. CHENEY & SON, Manlius, N. Y., Small Gray Iron Castings.

We warrant our work for smoothness
and finish.

DU PUY'S DIRECT PROCESS

Reduces ore puddling, heating furnace, forge clads of iron and steel scale and hammer slag, squeezed and rolled to bars at one heat. Blooms of 18 lbs. made in one hour from forge clads, yielding 38 lbs. out of 102 lbs. of clads. It eliminates phosphorus, producing superior metal at low cost for crucible or open hearth steel. The furnace is an ordinary reverberatory with slight modifications.
CHARLES M. DU PUY,
No. 14 North Fifth Street, Philadelphia

RUMSEY & CO.,

Schenectady, N. Y., U. S. A.,
Manufacturers of
800 STYLES OF HAND AND POWER
PUMPS,
FOR ALL PURPOSES AND USES.



HAND FIRE ENGINES.

Illustrated catalogues furnished upon application.
Factories, SENECA FALLS, N. Y. Warehouse, 93 Liberty St., New York City. L. M. RUMSEY & CO., Agents, St. Louis, Mo. BRINTON & CO., Agents, Chicago, Ill. MARCUS C. HAWLEY & CO., Agents, San Francisco, Cal. JUSTUS SCHMIDT, Agent, Hamburg, Germany.

THE

Gilbert & Bennett Mfg. Co.,

GEORGETOWN CONN.,
MANUFACTURERS OF

IRON WIRE, SIEVES AND WIRE CLOTH,

Power Loom Painted Screen Wire Cloth,
GILBERT'S RIVAL ASH SIEVE

Galvanized Twist Wire Netting,
THE UNION METALLIC CLOTHES LINE WIRE

Warehouse, - 42 Cliff St., New York.



John Maxheimer,

Manufacturer of
Patented
Japanese, Tinned
Wire,
First and Second-
Class Brass

Bird Cages.

Wires on both classes
fastened without solder.
The cheapest and most
suitable in market.
947 & 949 Pearl St.,
New York.



Grant Fan Mill & Cradle Co.

Manufacturers of

Grant's Grain, Coffee, Rice, Cochineal
and Pimento Fans,
and
TURKEY WING GRAIN CRADLES,
4, 5 and 6 fingers.
GRAPE VINE GRAIN CRADLES,
4 fingers.
SOUTHERN PATTERNS GRAIN
CRADLES,
4, 5 and 6 fingers.



All of a superior quality.
None genuine unless marked
Grant Fan Mill and Cradle Co.
Send for illustrated catalogue
and price list.
P. O. Address,
MELROSE Rensselaer Co. N. Y.



DUNBAR BROS.,

Manufacturers of

Clock Springs and Small Springs
of every description, from best Cast Steel
BRISTOL, CONN.

A. F. PIKE.

Pike Station, - New Hampshire,
Manufacturer and Wholesale Dealer in
Bluestone

For Scythes, Axes, Knives and Turpentine Hacks.

Factories at Pike Station, N. H.,
and Evansville & Westmore, Vt.

Genuine Old Reliable,
Indian Pond (Red End),
Premium Union,
White Mountain,
Lentille, Hacker,
Diamond Grit,
The New Bone,
Lamotte, Ragg,
Willoughby Lake,
Green Mountain,
Black Diamond,
Blowing Machine,
German Pattern,
Chocolate, Ax Bits,

Stones made, labeled and branded in any style de-
sired. PRICE AND QUALITY GUARANTEED. All the above
brands are of clear, & on grit and will not glaze.

Send for catalogue.

THE HARTFORD HAMMER CO.

Manufacturers of

Solid Cast-Steel Hammers

Under H. Hammond's Patent Process.
HARTFORD, - CONN., U. S. A.

RIEHL BROTHERS,

50 S. 4th St., Philadelphia.
Improved Power & Hand
SAND SIFTER.

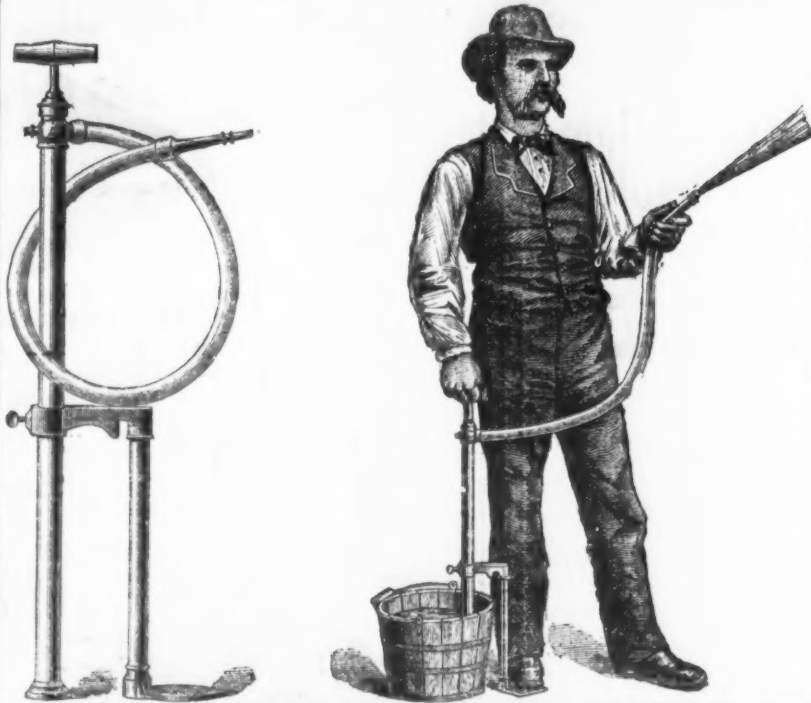
Every foundry should
have one. Send for prices.
A liberal discount to
dealers.

Illustrated catalogues furnished upon application.

Factories, SENECA FALLS, N. Y. Warehouse, 93 Liberty St., New York City.

L. M. RUMSEY & CO., Agents, St. Louis, Mo. BRINTON & CO., Agents, Chicago, Ill.

MARCUS C. HAWLEY & CO., Agents, San Francisco, Cal. JUSTUS SCHMIDT, Agent, Hamburg, Germany.



The above cuts (Fig. 259) represent our **PATENT AQUAPULT**, so valuable a Hand Force Pump that certain competitors have made bold to infringe on same, and even to resort to the crime of plagiarism in using our cuts and trade-mark name of article to decoy customers away from our manufacture and invention; and we caution the trade and customers against purchasing this article when not made by ourselves, as we intend to protect our rights under our patent.

WE ARE THE ORIGINAL AND FIRST INVENTORS OF THIS STYLE OF PUMP, AND HOLD VALID LETTERS PATENT ON SAME, AND ANY STATEMENT THAT IT HAD BEEN IN THE MARKET PREVIOUS TO OUR MANUFACTURE OF SAME IS OF COURSE ABSURD AND WITHOUT THE SLIGHTEST FOUNDATION IN TRUTH.

W. & B. DOUGLAS, Middletown, Conn.

BRANCH WAREHOUSES:

85 and 87 JOHN STREET, NEW YORK, and 197 LAKE STREET, CHICAGO, ILL.

UNION MANUFACTURING CO.

Sole Manufacturers of

SKINNER'S PATENT COMBINATION CHUCK.

Universal, Independent and
Eccentric.

By sliding a stud on the back of chuck it is instantly changed from Universal to Independent, and vice versa. Each Chuck is guaranteed perfect. All parts are made interchangeable. Only the very best materials used in their construction. Reversible or special jaws furnished when desired.

We also manufacture

Plain and Ornamental Butts,
Single and Double Acting Spring
Hinges,
Union Coil Door Springs,
Galvanized Pump Chain,
Patent Rubber Buckets,
Wooden Well Curbs, Wood Tubing,
Iron and Brass Pumps,
Patent Copper Pumps,
Hydraulic Rams, Power Pumps,
&c., &c., &c.

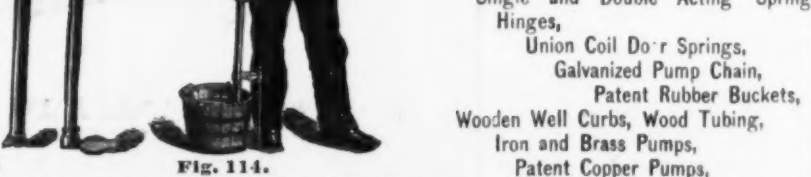


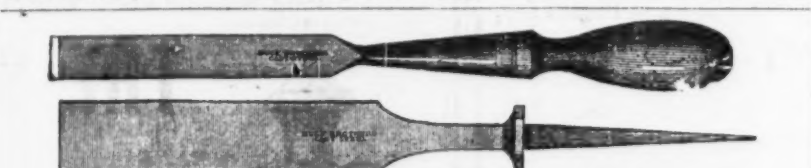
Fig. 114.

BEST HAND FORCE PUMP IN MARKET.

Made of brass. Is very light, and works extremely easy. Write us for prices.

UNION MANUFACTURING CO.,

Warehouse, 96 Chambers St., New York. NEW BRITAIN, CONN.



BUCK BROTHERS, Millbury, Mass.

The most complete assortment in the U. S. of

Shank, Socket Firmer and Socket Framing Chisels,

PLANE IRONS.

CAUTION.—Buyers should be on their guard and not have inferior goods palmed on them by unprincipled persons, who represent them as our make. Our tools are stamped "BUCK BROTHERS," and our labels have on our trade-mark, also "Riverlin Works."

BRIDGEWATER IRON CO., Bridgewater, Mass.

Manufacturers of

SEAMLESS DRAWN BRASS & COPPER TUBES,

BRIDGEWATER HORSE NAILS, 3d. FINE NAILS,

Tack Plates and Forgings of Every Description.

NAHUM STETSON, Jr., Agent, 73 Pearl Street, New York.

MAGNETIC IRON ORE. THE ALL IRON MINES.

Capacity, 100,000 Tons per Annum.

These mines are situated in Putnam County, near Brewster, N. Y., and are in the vicinity of the "Tilly Forster" mine, which formerly belonged to the same parties. These mines are now sufficiently developed to show a uniform quality of ore, the openings being a tunnel in the mountain of about 200 feet in length and 500 feet above tide-water level. The following analysis of the ore was made by Prof. Thos. M. Drown, of Philadelphia, Pa.:

ANALYSIS.	
Mag. Oxide of Iron.....	75.65
Protoxide of Iron.....	.85
Manganese Oxide.....	.09
Alumina.....	.44
Lime.....	1.32
Magnesia.....	.07
Silica.....	14.89
Phosphoric Acid.....	.37
Sulphur.....	.42
Titanic acid.....	.47
Total.....	99.44

We propose to offer the above F. O. B. at Port Morris, N. Y., at \$3 per ton for 30 per cent. ore. Address,

J. H. CHEEVER, Treasurer,

38 Park Row, New York City. P. O. Box 2180.

W. E. RIDER, General Manager at Mines.

Brewster, Putnam County, N. Y.

The Economic Progress of England and America.

Mr. Frederick N. Newcome publishes in the *British Trade Journal* a paper from which we take the following, which affords much food for thought:

While the Old World nations have stood stationary, or but slowly added to their accumulated store, the United States has progressed with a speed almost defying realization. Scarcely a century has passed since the Americans cast off the British yoke and won the battle for independence, and yet they already rival England and France in magnificence and material wealth. When the present census valuation is complete, we expect to find the estimated gross wealth of the three countries considerably larger than before, while the United States will presumably prove the richest of the three. In fact, if the computations of national estate made in 1850, 1860 and 1870 are at all reliable—and we have the valuable authority of Mr. Cornelius Walford in deeming them of great comparative accuracy—the accumulated real and personal estate of our transatlantic cousins cannot be worth less than £8,000,000,000 sterling—probably much more. For our own part, we should adopt a considerably higher estimate, as explained later on. In judging of this matter, it must be borne in mind that the resumption of specie payment has resulted in a general appreciation of property throughout the States, and that the estimates will be made under more favorable conditions than obtained at the previous census, when the country was suffering from serious depression.

First let us contrast the rate of progress in the United States with that in this country. The commencement of the present century seems a suitable time to start with, as, thanks to the estimate made for William Pitt when first imposing the income tax and to an independent investigation undertaken by Dr. Beeke, the wealth of Great Britain and Ireland at that time can be tolerably well gauged. These computations give a gross accumulated estate of some £2,500,000,000, which in 80 years we have increased to about £6,000,000,000. We are consequently 2.4 times as rich as then. On the other hand, American statistics compute the value of real and personal property in 1800 at \$1,072,000,000. In 1840 the income tax assessment showed a capital of \$3,764,000,000, which was increased in the next decade to \$7,135,780,000, then to \$16,159,000,000 in 1860, and to \$30,059,000,000 in 1870. The population at that date was 38,558,371, and the average property of each person about \$777. Now the States possess over 50,000,000 inhabitants, and, supposing the average is no higher now—which seems very unlikely, seeing that the mean value of each person's property shows a continual progressive rise from \$220 in 1840 to \$307 in 1850, to \$510 in 1860, and to \$777 in 1870—the present wealth would be 50,152,866 x 777 = \$38,868,776,882, or, say in round figures, £8,100,000,000. But in all probability the average possessions will be found to exceed \$1000 in value, and this opinion is strengthened by the enhanced yield of certain taxes, and by the extraordinary rise in the assessment value of various townships. True, the population has increased by 11,594,495, or over 30 per cent., but this is of little moment if property has increased 80 or 100 per cent. meanwhile. It is quite certain the assessments in some districts are double and treble what they were in 1870. Taking what we consider the minimum basis of \$1000 per head, the gross capital in 1880 would largely exceed £10,000,000,000 sterling, and it seems unquestionable that, marvellous as are the resources of England and France, neither of these nations have yet attained to such a magnificent estate.

Somewhat curiously, the 30 per cent. rise in population accords almost exactly with an estimate made in 1865 by the *New York Bankers' Magazine* regarding the average decadal augmentation, but owing to the depression incident to the Civil War, the actual totals in 1870 fell somewhat short of those anticipated. The following shows how remarkably near the statist was in his guess:

Year.	Population.	National Wealth.	Average Wealth of each Person.
Official assessment.....	1860 31,500,000	\$16,159,000,000	\$510
Official assessment.....	1870 38,558,371	30,059,000,000	777
Official assessment.....	1880 50,152,866	Unknown.	???
Bankers' Magazine estimate.....	1870 40,950,000	32,318,000,000	789
Bankers' Magazine estimate.....	1880 53,325,000	64,616,000,000	1214

In compiling his ingenious table the writer assumed that the decennial increase of population for the remainder of this century would be at the rate of 30 per cent., and of national wealth at the rate of 100 per cent. It has been shown how between 1870 and 1880 the rise in population was 30 per cent., but that, owing to the losses occasioned by the internecine war, the former decennial showed an advance of only 22.4 per cent. Meanwhile wealth accumulated 86.1 per cent., as against the 100 per cent. expected. Admitting that the period 1870-80 was no more prosperous than its predecessor, which is open to doubt, even in the face of the serious commercial depression which over-spread the country when the last railway mania closed in 1873, national estate would now be worth the magnificent total of \$55,958,412,000, or, allowing the dollar at 4/2, say, £11,658,003,500 sterling. Comparing, however, the general state of the country in 1860, 1870 and 1880, and analyzing the relative rise in railway industry, in municipal debts, in production of cotton, wool and breadstuffs, in the assessments and revenues of the leading States, in the volume of exports and imports, in the amount of gold and silver held in the country, in the output of coal and iron, and in the number of manufactures in existence and the capital employed therein, one is compelled to believe that progress was faster in the decennial period just closed than in the one between 1860 and 1870.

Little surprise need be felt should the

official assessments of property enable American statisticians to claim a total wealth of £12,000,000,000. Astounding as are these figures, it assumes an accretive power of but little over 90 per cent. for the ten years; whereas in that between 1850-60 the power was no less than 126.45. If anything like this rate has again been attained—and Americans say the country is more prosperous now than ever—another few years will find the aggregate accumulations worth over £20,000,000,000 sterling. When we remember that the income of the United States is generally computed to exceed 25 per cent. upon the total wealth, as against about 11 per cent. in England, the marvellous recuperative faculty of the former is readily understood. To increase 90 per cent. in ten years only means progressively laying by each year 6½ per cent. on capital, or 26½ per cent. of the income. A far better insight into the growth of a nation is afforded by examining the progressive annual, instead of the decennial, increase. Oakes' Compound Interest Tables give the results at a minimum of trouble, and we invite both English and American statisticians to adopt the practice in calculating all questions of progressive increase, whether of wealth, population, or income. The principle has never been previously used, but for purposes of scientific analysis it will be found more lucid than simply calculating from period to period.

Adopting this method of investigation, we find that during the period 1830 to 1840 the average annual progressive increment to capital was about 3.9-16ths per cent.; from 1840 to 1850, 6½ per cent.; from 1850 to 1860, rather over 8½ per cent.; and from 1860 to 1870, about 6.13-32ds per cent.; while over the 30 year period from 1840 to 1870 the average rate is about 7.3-16ths per cent. Contrast this with the best English decennial, 1865-75, which Mr. Robert Giffen makes the occasion for an outburst of patriotic laudation in his essay "On Recent Accumulations." Granting that his deductions are in the least reliable, which we deny, he tries to prove that national estate rose from £6,100,000,000 in the former year to £6,500,000,000 in the latter, or an average increase of £240,000,000 per annum, tantamount to a progressive rise of 3.13-32ds per cent. But it happens that Mr. Giffen's calculation is purely hypothetical—shall we say erroneous? Mr. Dudley Baxter was forced to admit that in 1843 the income of the nation exceeded £500,000,000; therefore, at the very lowest estimate, the gross capital was worth £4,500,000,000. Between 1843 and 1865 is a space of 22 years, and, if we mistake not, England made greater economic progress during that period than at any other epoch in history. Was not this the period when England adopted free trade; when her exports rose from £50,000,000 to £190,000,000, and her imports from, say, £80,000,000 to £295,000,000; when steam was generally applied to inland and marine transport, and when the Australian gold fields poured in their flood of wealth? Yet, according to this statistic, the capital of the country in 1865 was only £6,100,000,000. On this showing the progressive annual saving would only be about 1½ per cent., an evident absurdity. But the fact was Mr. Giffen was misled by the assessment to income-tax returns, forgetting that their increased yield was almost entirely due to the improvement in the government machinery for collection, which put a stop to myriads of large and small leakages, and also to the assessments being continually raised to a nearer and nearer approximation of the real letting value of land and tenements. Had he carefully studied the reports of the Commissioners of Inland Revenue he could scarcely have fallen into the pitfall, while a separate examination of the Irish statistics must have disclosed the fallacy. How Mr. Giffen can conclude that during the period 1865 to 1875—which began with three years of serious depression—wealth compounded at 3.13-32ds per cent., against 1½ per cent. in the 22 previous years, is decidedly a mystery. Over the 42 years between 1843-75 the average rate was only about 1.17-32ds per cent. This means that it has taken the United Kingdom nearly 50 years to double its wealth, whereas in the United States wealth has doubled about once in every ten years since 1840.

The Northeastern Steel Company, Limited.—The *Engineer* prints the following: Since Mr. Thomas returned from America some progress appears to have been made in the formation of the new steel company at Middlesbrough, for which a certain syndicate bought 20 acres of land a few months since. The company is to be called the "Northeastern Steel Company, Limited," and among the first directors will be Messrs. S. G. Thomas, P. C. Gilchrist, A. J. Dorman, T. Wrightson and J. Denton. It is said that the promoters and their friends have already subscribed £80,000 out of the total of £200,000 required. It is proposed to work upon the basic process only, and to produce in the first instance ingots, blooms, billets and tires. Four converters will be put down and the weekly product arrived at will be 2000 tons. It is hoped that a large business may be done with existing rolling mills in the locality in hammered or cogged blooms, and that in this way, if steel is to supersede iron for purposes other than rails, the present iron manufacturers may find it to their interest to work with rather than against the new company. It is contemplated, also, to make arrangements with some of the neighboring smelters to supply pig iron in the molten state. It is understood that a well-known engineer of high repute has been provisionally engaged as general manager. Should the remainder of the shares be taken up, as is hoped, operations will be commenced forthwith, and the new company might expect to be at work by the end of 1882, or early the following year. The birth of this company's the outcome of the efforts of those in the district and elsewhere who are sanguine as to the future of basic steel. It is only right to add, however, that there are a great many others, whose position and experience entitle them to respect, who consider that the commercial success of the basic process is still problematical, and that the victory of steel over manufactured iron other than rails is much more so.

AUBURN FILE WORKS,

Superior Hand-Cut
FILES AND RASPS,
MADE FROM IMPORTED STEEL. EVERY FILE WARRANTED.
FULLER BROS., Sole Agents,
89 Chambers and 71 Reade Streets, N. Y.

Paris, 1878.


McCAFFREY & BRO.,

For Superiority.



PENNSYLVANIA FILE WORKS,

Philadelphia, Pa., U. S.



Manufacture and keep in stock a full line of **FILES** and **RASPS** only, for which we claim special advantages over the ordinary goods, and ask domestic and foreign buyers to allow us to compete for their trade.

Superiority acknowledged wherever used, sold or exhibited.

GRAHAM & HAINES,

P. O. Box 1042.

113 Chambers and 95 Reade Streets, New York.

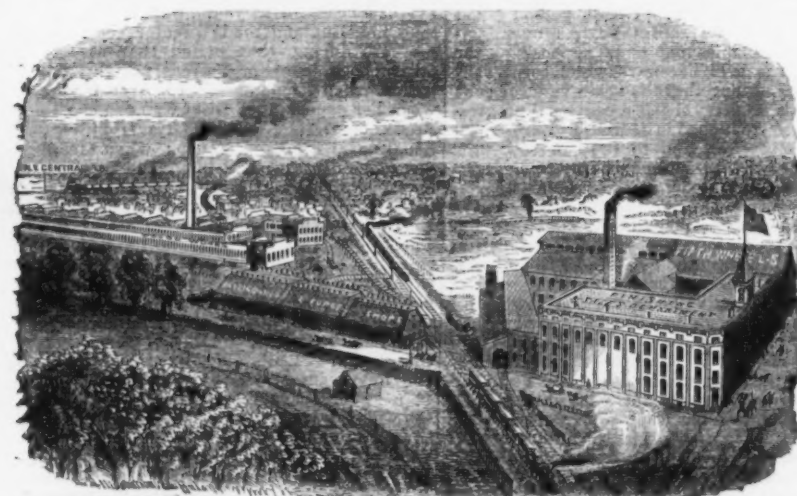
HARDWARE MANUFACTURERS' AGENTS, as follows:

Detroit Block Works,
Tackle Blocks,
Howard Bros. & Co.,
Cotton, Wool and Curry Cards,
Thompson, Derby & Co.,
Scythe Snaths,
Otago Fork Mills,
Steel Forks, Rakes, Hoes, &c.,
H. Knickerbocker,
Scythes, Axes and Tools,
H. W. Kipp, Nail Hammers,
Iron City Tool Works Ltd., Vises,
Picks, Mattocks, Grub Hoes, &c.,
Jacobus & Nimick Mfg. Co.,
Locks, &c.,
Sandusky Tool Co.,
Planes and Plane Irons,
Geo. M. Eddy & Co.,
Measuring Tapes.

Wheeling Hinge Co.,
Hinges and Wrought Butts,
Northwestern Horse Nail Co.,
Horse Nails,
A. G. Coe & Co.,
Coe's Genuine Screw Wrenches,
F. K. Silby, Emery Cloth,
Sedgwick Mfg. Co.,
Butter and Flour Triers, etc.,
Ripley Mfg. Co., Mouse Traps,
Sam'l Loring,
Plymouth Tack & Rivet Works,
Carr, Crandall & Deelin,
Miscellaneous Hardware & Cast Butts,
J. Mattinson,
Cast Steel Shears and Scissors,
Ketchum's Pat. Metallic Sieves.

W. D. Turner & Co.,
Geneva Hand Fluters,
American Screw Co.,
Gimlet Pointed Screws, &c.,
Romer & Co., Brass Locks, &c.,
F. Lowenthal, Compasses,
Callipers, Dividers, &c.,
Clark Bros. & Co.,
Carriage Bolts, &c.,
Lowrey & Tucker, the Genu-
ine Knox Plating Machine,
T. B. Barclay,
"Dodge's" Kentucky Cow Bells,
Lane Bros., Swift's and Gro-
cers' Coffee Mills and Measuring
Faucets, &c.,
T. C. Richards Hardware Co.,
Bright Wire Goods, Picture Nails,
&c.

CARRIAGE HARDWARE.



Our new Illustrated Catalogue of 140 pages, and over 300 illustrations, will be mailed on application.

THE E. D. CLAPP MFG. CO., Auburn, N. Y.

NEW YORK STAMPING CO.,

311 & 313 Avenue A, NEW YORK,

MANUFACTURERS OF



SHEET IRON WARE,

Patent Corrugated Bottom Coal Hods,

PATENT ACME FRY PAN

Edgar's Patent "Gem," "Victor," "U. S.," "Climax" and "O. K."

Stove Shovels.

POLISHED FRY PANS, &c.

Send for catalogue.

TACKS, NAILS & RIVETS.

Swedes Iron Upholsterers' Gimp, Lace and Card Tacks. Black and Tinned Trunk and Clout Nails.
Finishing Nails and Brads; Shoe Nails of Swedes and Common Iron; Copper, Brass & Steel
Lining & Saddle Nails; Tufting Nails & Tufting Buttons; Brass and Iron Wire
Nails, Molding Nails, Escutcheon Pins, Black and Galvanized
Regular and Chisel Pointed Boat Nails.

New York Salesroom, 116 Chambers Street.

AMERICAN TACK CO., Fairhaven, Mass.

R. COOK & SONS,

Manufacturers of

Carriage & Wagon AXLES,

WINSTED, CONN.

ESTABLISHED - - - 1839.

FILES

JOHNSON & BRO.

No. 1 Commercial Street, Newark, N. J.

Nicholson FILES.

Bandsaw Files,
Boot Heel,
Brass,
Cabinet,
Cant,
Cotter Taper,
Cotter Equaling,
Cross or Crossing,
Doctor,
Drill,
Feather Edge,
Finishing,
Flat,
Flat Equaling,
Flat Wood,
Gang-Edger,
Ginsaw,
Gulleting,
Half-Round,
Half-Round Wood,
Hand,
Hand Equaling,
Handsaw Blunt,
Handsaw (Double-Edger),
Handsaw Taper, single cut,
Handsaw Taper, double cut,
Handsaw Taper, slim,
High Back,
Hook-Tooth,
Knife,
Knife Blunt,
Lead Float,
Lightning,
Machine Mill,
Mill,
Mill Blunt,
Mill Pointing,
Pillar,
Pitsaw,
Reaper,
Roller,
Round,
Round Blunt,
Slotting,
Slim Handsaw Taper,
Square,
Square Blunt,
Square Equaling Files,
Stave Saw,
Three-Square Files,
Three-Square Blunt Files,
Tumbler Files,
Union Cut,
Warding Files,
Warding Blunt File,
Warding Round Edge File.

RASPS.

Baker's,
Beveled Edge,
Bread,
Cabinet,
File, Flat and Half Round,
Flat Shoe,
Flat Wood,
Half-Round Shoe,
Half-Round Wood,
Horse, Plain and Tanged,
Horse Mouth,
Jig,
Oval or French Shoe,
Racer, Plain and Tanged.

SPECIALTIES.

Butchers' Steels, Improved,
Bent Riffles, Handled,
File Cards,
File Brushes,
Machinists' Scrapers,
Stub Files & Holder,
Surface File Holder,
Vise File Holder.

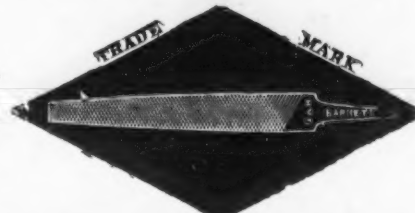
NICHOLSON FILE CO.,

PROVIDENCE,

R. I.,

SOLE MANUFACTURERS.

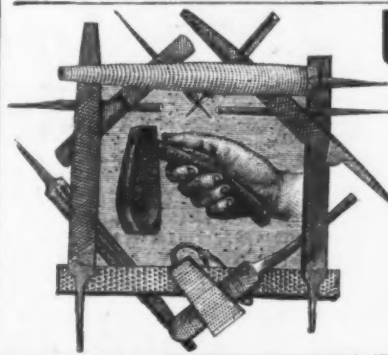
Black Diamond File Works.

Awarded by Jurors of Centennial Exposition, 1876, for
"VERY SUPERIOR GOODS."
G. & H. BARNETT

39, 41 & 43 Richmond St., Philadelphia.

CHARLES B. PAUL, Manufacturer of HAND CUT FILES.

Warranted CAST STEEL. 157 Tenth Street, Williamsburgh, New York. Established 1843.



UNION FILE WORKS,

311 to 315 North St.,

BALTIMORE, MD.,

Manufacturers of

FILES AND RASPS

Made from the Best Refined Cast Steel. With all the requisite facilities to produce a first-class article, we are enabled to offer Files that will give entire satisfaction.

MORITZ & KEIDEL, Agents,
48 & 50 German St., Baltimore, Md.

ESTABLISHED 1842.

INCORPORATED 1881.

CHAS. F. CRIPPS, President.

GILBERT PARKER, Treas. and Gen. Agent.

THE J. BARTON SMITH CO.,

Manufacturers of the Celebrated

J. B. SMITH'S FILES, RASPS, WOOD SAWS, &c.,

211, 215 & 217 New Street, PHILADELPHIA.

New York Branch, 128 Chambers Street.

WM. H. BRAMHALL, Manager.

Send for sample order.



J. M. KING & CO.

WATERFORD, N. Y.,

Manufacturers of the BUTTONS PATENT

"WIRE CUTTER AND PLIER COMBINED."

Specially Adapted for Use on Wire Fence.

Also Manufacturers of

Blacksmith and Machinists' Stocks and Dies, Plug and Taper Taps,
Hand, Nut and Screw Taps, Pipe Taps and Reamers.

Price List on application.

Established by DANIEL B. KING, 1829.

THE SWIFT MILL.

ESTABLISHED 1845.

The annexed cut shows one of the many styles of Coffee Mills of our manufacture, especially adapted to Grocers' use and all retailers of coffee. They are highly ornamental, and workmanship of the very best. We make more than 30 styles.

ALSO LANE'S PORTABLE COFFEE ROASTER

Will roast 30 to 40 lbs. at once, and can be used as a stove at other times. Send for descriptive list to Manufacturers.

LANE BROS., Millbrook, N. Y.

Also sold by leading wholesale houses.

Our agents, Graham & Haines, 113 Chambers St., New York,
carry a full line of our goods, and will be pleased to serve you at fac-
tory prices.

SANDS' TRIPLE MOTION WHITE MOUNTAIN ICE CREAM FREEZERS.

THE WHITE MOUNTAIN FREEZER COMPANY are headquarters for Ice Cream Freezers and Ice Crushers, being the only firm in the United States who manufacture all parts of the raw material. The examining Committee, consisting of 50,000
citizens of the United States have recom-

mended the *Sands' Triple Motion White Mountain Freezer* to all persons in the world for the following reasons: We have used them; they freeze quicker than any other; they save time, salt and ice; the triple motion makes smooth cream without lumps; makes more of it; galvanized iron outside; tin inside; no zinc in contact with the cream; easily adjusted; substantially made; simple in construction; perfect in results. Send for descriptive circular and discount of this celebrated Freezer. Address,

HAND FREEZER.
2 to 25 qts.
\$1.50 to \$25.00.HAND OR POWER.
25 and 50 qts.
\$75.00 and \$175.00.HAND OR POWER.
ICE CRUSHER.
\$75.00.White Mountain Freezer Co.,
Laconia, N. H., U. S. A.

SPECIAL ATTENTION GIVEN TO EXPORT ORDERS.

Morrill's Perfect Saw Sets.

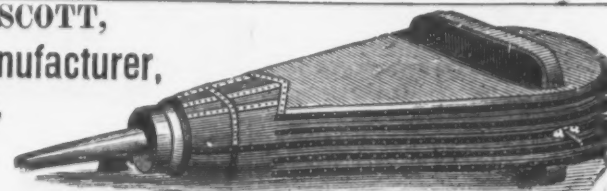
For price lists and discounts, address

ASA FARR,

64 College Place,
corner of
Chambers Street,
New York.

GEO. M. SCOTT, Bellows Manufacturer,

Johnson Street,
Cor. 22d St.,
CHICAGO, ILL.



A. FIELD & SONS,

TAUNTON, MASS.,

MANUFACTURERS OF

AMERICAN AND FRENCH WIRE NAILS, TACKS, SHOE NAILS, And Every Variety of Small Nails.

Offices & Factories at Taunton, Mass.

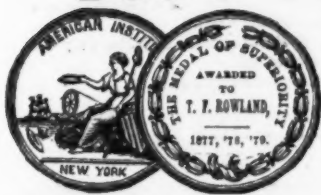
Warehouse at 78 Chambers St., New York,

where may be found a full assortment of Tacks, Brads, Wire Nails, &c., for the accommodation of the New York Wholesale and Jobbing Trade.

Any variations from the regular size or shape of the above-named goods made from sample to order.

A SILVER MEDAL has been awarded above goods at the Paris Exposition, being the only medal awarded any American manufacturer of Tacks and Wire Nails.

DUK'S PREMIUM ELEVATOR BUCKET.



ALWAYS FIRST
COMPETITIVE



PREMIUM IN
TESTS.

This Bucket is struck out from the best charcoal iron; consequently is very durable. It requires 50 per cent. less power to run it than the old-fashioned square bucket, and will outwear half a dozen of them. Over 250,000 are now in use by the principal Millers, Brewers, Distillers and Manufacturers at home and abroad. It is the best Bucket made.

CAUTION.—The popularity of the DUK BUCKET has caused many manufacturers of the old style of Elevator Bucket to closely imitate its spherical shape. We warn all parties against patronizing infringers of our patents, as they will be held accountable. Send for circular. Address

T. F. ROWLAND, Sole Manufacturer, Continental Works, BROOKLYN, N. Y.

The Mill Bucket, in sizes from 3 1/4 to 16 inches.

OLD COLONY RIVET CO., Kingston, Mass.

(Established 1866.)

Manufacturers of NORWAY IRON RIVETS of Superior quality.

We carry a large stock of the various sizes of *Tinners', Carriage, Wagon, Hame, Bell, Barrel, Safe and Tank Rivets*, and make promptly to order all sizes not larger than 7-16 inch diameter. We have a capacity of two tons of the various sizes of small Rivets per day of ten hours. Freight allowed to all points on or east of the Mississippi River. Correspondence with buyers solicited.

WILLIAM H. DUNBAR, President.

HENRY HOBART, Treasurer.

JAMES L. HALL, General Agent and Manager.

We carry the most complete stock in the city with our New York agents, *The American Tack Co.*, 116 Chambers St.

John Chatillon & Sons,
91 & 93 CLIFF ST., NEW YORK.



Manufacturers of

SPRING BALANCES

Patent Balances,

UNION AND COUNTER

SCALES,

SPIRAL SPRINGS,

Send for Illustrated Price List.

AGENTS IN ALL FOREIGN COUNTRIES.



119 South Fourth Street,
PHILADELPHIA

Branch Office, 605 Seventh St., Washington, D. C.
H. HOWSON, Engineer and Solicitor of Patents.
G. HOWSON, Attorney at Law and Counsel in Patent Cases.
NEW YORK OFFICE, 116 CHAMBERS ST.

THE ANSONIA CORRUGATED STOVE PLATFORM.

With Patented O. G. Border.



Cut Showing Round Platform.

ROUND ZINC.

27, 30, 32, 34, 36 inch.

Manufactured of heavy metal, requiring no nailing or lining, the edge retaining its form. Superior pattern, finish and quality. Price as low as any.

Send for List and Discount.

Packed 12 in each case.

PURE ELECTRIC WIRE,

Manufactured by the

ANSONIA BRASS AND COPPER COMPANY,
For Magnets, Telegraphs, Telephones, &c.

Insulated on the bare wire with H. Splittorf's patented Liquid Insulation, covered with cotton or silk.
All sizes of Bare and Covered Wire in Stock.
The conductivity of every bundle tested and warranted.

THE ANSONIA WROUGHT GONGS,
For Clocks, Indicators, Telephones, Call Bells, Bell Punches, Steamboat and Railroad Use. Burnished or Nickel Plated.

ANSONIA BRASS AND COPPER CO., 19 Cliff St., New York.

ESSEX HORSE NAILS.

Hot Forged, Warranted Best Quality, Pointed and Polished.

HOWE & CO., Troy, N. Y. Sole Agents.

Single Cylinder Versus Compound Engines.

The report, just issued, of the Chief Engineer of the Boiler Insurance and Steam Power Company, limited, of Manchester, England, contains the record of very interesting trials made by Mr. Niel McDougall to give some data as to the relative efficiency of single cylinder and compound engines. In order to make the comparison under conditions as nearly alike as possible he chose a simple expansive and a compound engine made by the same builder. The following is a description of both of these engines and a record of their work:

TABLE I.—DESCRIPTION OF ENGINES AND BOILERS.

	Engine B.—Compound.	Engine C.—Simple Expansive.
1. Description of engines.....	Pair of horizontal compound tandem. Corliss valves to H. P. Ord. slide valves to L. P. cylinders, steam jacketed & clothed.	Inverted vertical. Corliss valves. Cylinder, atm.-jacketed and clothed.
2. Cylinders.....	Four.	One.
3. ".....	H. P. 20 in.	32 in.
4. ".....	L. P. 31 in.	4 ft.
5. ".....	6 feet.	
6. Piston rods.....	2.42 : 1	
7. Clearances in cubic inches.....	H. P. Front... 3 1/4 in. L. P. Front... 4 1/4 in. L. P. Back... 3 3/4 in.	4 1/2 in.
8. Clearances.....	H. P. 398	1361
9. Steam pipe.....	H. P. 916	.035
10. Intermediate pipe.....	H. P. .0176	8 in.
11. Exhaust pipe.....	L. P. .0187	11 in.
12. Air pumps.....	5 1/2 in. 7 1/2 in. 10 in.	One, 26 in. diam., 22 ft. stroke, driven from crank shaft by gearing and belt; 1 double stroke of pump to 1.54 revolutions of engine.
13. Description of boilers.....	Two, each 21 in. diam., 2 ft. stroke, worked by bell crank from piston crosshead.	2 Lancashire, each 30 ft. by 7 ft.; internal flues, 2 ft. 9 in. diam., with 9 water tubes in each. Working in connection with Green's economizer. 120 pipes. (At work about 5 years.)
14. Total grate area in square feet.....	51.25	64
15. Total heating surface of boilers (sq. feet).....	2550	1600
16. Total heating surface of economizer (square feet).....	1270	1526
17. Total heating surface of boilers and economizer (square feet).....	3820	3126
18. Grate surface per I. H. P. (at time of trial).....	128 square feet.	1185 square feet.
19. Heating surface per I. H. P. (at time of trial) economizer included.....	6 square feet.	5.79 square feet.
20. Ratio of grate to heating surface.....	1 : 47	1 : 48.8
21. Total steam space.....	808 cubic feet.	540 cubic feet.
22. Steam space per I. H. P. (at time of trial).....	1.27 cubic feet.	1 cubic foot.

TABLE II.—RESULTS OF TRIALS.

	Engine B.—Compound.	Engine C.—Simple Expansive.
1. Duration of trial.....	5 1/4 hours	6 hours
2. Total number of revolutions by counter.....	14,710	29,802
3. Revolutions per minute.....	46.7	82.8
4. Piston speed in feet per minute.....	560.4	662.4
5. Mean indicated horse-power.....	H. P. Cyls. 321 L. P. Cyls. 314 Total 635	540
6. Mean boiler pressure per indicator.....	71 lbs.	70 lbs.
7. Mean condenser vacuum per gauge.....	27 1/2 inches	27 inches
8. Mean barometer pressure.....	29.6 inches	29.4
9. Mean initial pressure in cylinders.....	H. P. 63 lbs.	61 lbs.
10. Mean temperature of feed.....	41° F.	42° F.
11. Mean temperature of injection.....	57 1/2° F.	46 1/2° F.
12. Mean temperature of discharge.....	92° F.	92° F.
13. Mean ratio of expansion, taking clearance into account.....	6.56	4.27
14. Total weight passed through boilers.....	63,570 lbs.	67,125 lbs.
15. Weight used per hour.....	12,109 lbs.	11,187 lbs.
16. Weight used per hour for donkey pump.....	120 lbs. (estimated)	100 lbs. (estimated)
17. Total weight per I. H. P. per hour.....	19.07 lbs.	20.7 lbs.
18. Net weight per I. H. P. per hour, deducting for donkey pump.....	18.91 lbs.	20.5 lbs.
19. Weight per I. H. P. per hour, calculated from the diagram.....	15.1 lbs.	18.8 lbs.
20. Percentage accounted for by indicator.....	50	91
21. Weight required for perfect engine working between the same limits of temperature, with complete expansion.....	8 lbs.	8 lbs.
22. Actual efficiency compared with perfect engine.....	0.423	0.39
23. Total weight burnt.....	9546 lbs.	7616 lbs.
24. Total weight burnt per hour.....	1818 lbs.	1269 lbs.
25. Total weight burnt per I. H. P. per hour.....	2.86 lbs.	2.35 lbs.
26. Total weight burnt per square foot of grate per hour.....	22.37 lbs.	19.8 lbs.
27. Total weight burnt per square foot of heating surface.....	0.476 lbs.	0.406 lbs.
28. Description of coal.....	Hulton's Yard Slack.	Black Mine Engine Burgin, Dukinfield Deep Pit
29. Percentage of ash.....	11	8.2
30. Water evaporated per pound of coal at observed temperature and pressure.....	6.66 lbs.	8.81 lbs.
31. Equivalent evaporation from 100° at 212°.....	7.22 lbs.	9.53 lbs.
32. Evaporation per square foot of heating surface per hour.....	3.17 lbs.	3.58 lbs.

Although in the single-cylinder engine the steam was only expanded 4.27 times, it is evident from the figures given that the difference between the two engines in point of horse-power per hour for 3000 working hours—figures which show that a saving of a fourth of a pound of coal per horse-power per hour may be no importance whatever,

Cutlery.

FRIEDMANN & LAUTERJUNG,



Manufacturers of
PEN AND POCKET CUTLERY,
Solid Steel Scissors, Shears, Razors, &c.
Sole proprietors of the renowned full concave

"ELECTRIC RAZORS,"
And the celebrated "ELECTRIC SHEARS." Nickel Plated
Bows.

Agents for the BENGALL RAZORS.

AMERICAN TABLE CUTLERY, BUTCHER KNIVES, &c.
91 Chambers and 73 Reade Sts., N. Y. 423 N. Fifth St., ST. LOUIS, Mo.

THE

LAMSON & GOODNOW MFG. CO.,

Sale room and Warehouse,

88 Chambers Street, New York City.

Factories,

Shelburne Falls, Mass.

Superior Cutlery of all kinds and grades, from the finest in pearl and ivory handles to the lowest price in wood and iron handles.

OUR

BUTCHERS' and HUNTERS' KNIVES

Are warranted to be equal in style, finish and quality, to any goods made in the world.

"COMPARE, THEN JUDGE."

We are the sole owners of the Gardner Patent Guard and Rest for Carving Forks, and the manufacture of fine carvers is with us a specialty.

AARON BURKINSHAW, Pepperell, Mass.,

Manufacturer of

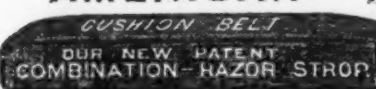
PRUNING, BUDDING AND POCKET KNIVES

OF EVERY DESCRIPTION.

My Blades are forged by hand from the best cast steel and warranted.

Established 1853.

AMERICAN MADE RAZORS



J. R. TORREY,
MANUFACTURER OF
STROPS

J. R. TORREY RAZOR CO.,
MANUFACTURERS OF
RAZORS.

To introduce we offer HOLLOW GROUND RAZORS at \$1.50, \$1.75, \$2; Ivory, \$2.50. Our SWEDISH GEN RAZORS, \$2.75, \$3; Ivory, \$3.50. All our own make, and warranted the best cutters in the world. As razor makers we know what is needed to sharpen a dull razor and will mail for 75 cts. a Strop warranted to set a fine edge to any razor. If in Morocco case, \$1. Catalogues to the trade.

BRADFORD & ANTHONY, Boston, Mass.,

ENGSTROM'S RAZORS.

BRADFORD & ANTHONY,
BOSTON, MASS.

SOLE AGENTS FOR

SWEDISH RAZORS

THE BEST IN THE WORLD.

These RAZORS are esteemed in Europe as the best cutters made in the world. The testimony that comes to us in regard to them is that "in cutting quality they do not exist any RAZORS at all that can stand a comparison with those made by JOHAN ENGSTROM." Extreme care is used in their manufacture. Every blade being hardened and tempered by MR. ENGSTROM himself by a secret chemical process which renders it impossible for any razor not to be of the Best Cutting Quality. They will be found to shave any beard growing on the human face.

Prices are \$2.00, \$2.50, \$3.00, \$3.50 each. A SHOW CASE, containing one razor of each of the eight styles as samples, with a strop made expressly for Engstrom's Razors, will be mailed to any DEALER, on receipt of Post Office Money Order for \$14.75, which covers all charges for packing and mailing.

Every RAZOR is fully WARRANTED by BRADFORD & ANTHONY.

Importers, Manufacturers' Agents and Wholesale Dealers in

American and Foreign Cutlery.

JOHN WILSON'S CELEBRATED

TRADE MARK.



FOUR PEPPERCORNS AND A DIAMOND.
GRANTED A D 1766 BY THE
CORPORATION OF CUTLERS OF SHEFFIELD
AND PROTECTED BY ACT OF PARLIAMENT
REGISTERED ALSO AT
WASHINGTON U.S.A. ACCORDING TO ACT OF
CONGRESS
ALSO AT LEIPZIG, IN
ACCORDANCE WITH THE GERMAN TRADE
MARKS REGISTRATION ACT.

BUTCHERS' KNIVES,
BUTCHERS' STEELS,
AND
SHOE KNIVES.

It having come to the knowledge of JOHN WILSON that Counterfeit Butchers' Knives, purporting to be of his manufacture, are being sold in the United States, he hereby cautions all purchasers of his Knives and Steels to be on the alert against such imposition.

JOHN WILSON also hereby gives Notice, that it is his determination to institute Legal Proceedings against any person or persons who may be detected infringing his Trade Mark.

Every article of JOHN WILSON'S manufacture, bears the Trade Mark, in addition to the Name.

WORKS—SYCAMORE ST., SHEFFIELD, ENGLAND. Established 1756

Manufactured of Imported English Cast Steel.

Every Pair Warranted.

For samples and prices address,

GIFFORD MANUFACTURING CO.,

Union City, Conn.

Torrey's Door Springs.

S. ROEBUCK & CO.,

Manufacturers,



161 Fulton St.,
NEW YORK.

Torrey's Patent

COG WHEEL



Ice Cream
Freezers.

Torrey's Door Springs.

S. ROEBUCK & CO., Manufacturers,

164 Fulton St., New York.

Cutlery.

ALFRED H. HILDICK,

No. 11 Murray St., N. Y.,
Importer of CHAINS, ANVILS, VISES, &c.
Agency of
HILL BROTHERS & CO., WALSALL, ENGLAND
GENERAL HARDWARE MERCHANTS,
And of

BALL'S PAT. SOLID STEEL SHEEP SHEARS.
These shears are unsurpassed for cheapness, durability and utility. They are made of one solid piece of steel from point to point, and cannot be broken in use either in the bow or at the junction of the shank and blade. Samples can be seen at above address, or sample lots furnished.

CORPORATE MARK,



Joseph Rodgers & Sons'

(LIMITED)

CELEBRATED CUTLERY,

No. 82 Chambers Street, New York.

F. & W. CLATWORTHY, Agents.

The demand for Joseph Rodgers & Sons' productions having considerably increased, they have, in order to meet it, greatly extended their Manufacturing Premises and Steam power.

To distinguish Articles of Joseph Rodgers & Sons' Manufacture, please to see that they bear their Corporate Mark.

P. O. Box 996.

ESTABLISHED 1836.

Alfred Field & Co.,

COMMISSION MERCHANTS,

New York, Birmingham, Sheffield, Liverpool.

Guns and Pocket Cutlery.

SPECIALTIES.

Headquarters for
ELEY'S BROS. GOODS, WRIGHT'S ANVILS,
WILSON'S BUTCHER KNIVES, &c.
WESTONHOLM'S POCKET CUTLERY AND RAZORS,
FIELD, FRASER & CONTINENTAL POCKET KNIVES,
BUTCHER'S FILES, TOOLS AND RAZORS,
JOSEPH ELLIOTT'S CELEBRATED RAZORS,
WESTERN FILE CO.'S FILES,
ENGLISH AND GERMAN GUNS,
ROBERT SORBY & SONS' SHEEP SHEARS,
STUBS' FILES, WESTERN FILES,
GRIEVE'S SHEEP SHEARS,
WESTONHOLM'S TAPES,
GERMAN COIL AND HALTERS and other CHAINS,
BRADSHAW TROWELS AND HOES,
CANASTOTA KNIFE CO.'S POCKET KNIVES,
Etc., Etc., Etc.

All sorts of Hardware and Merchandise for import and export purchased on commission.

ROBERT SORBY & SONS,

SHEFFIELD,

MANUFACTURERS OF THE CELEBRATED

Kangaroo Sheep Shears.

The best

Shears

made.

Every

Shears

guaranteed.

ALFRED FIELD & CO.,

93 Chambers St., NEW YORK,

SOLE AGENTS.

Send for price list and terms.

FURNESS, BANNISTER & CO.,

NEWARK, N. J.

Manufacturers of

TABLE CUTLERY.

PRICES FURNISHED ON APPLICATION.

Cutlery.

McCOY & SANDERS,

Hardware, Cutlery, &c.,

P. O. BOX 390, NEW YORK.

Sole Agents for

THEILE & QUACK'S CELEBRATED CUTLERY.
WADE BROS. AND TYLER & CO.'S CUTLERY.
IRVING CUTLERY CO.
ELMWOOD CUTLERY CO.
SHEARS, MIDDLETOWN SHEAR CO.
WROUGHT IRON TACKLE BLOCKS.
EADIE'S DIFFERENTIAL PULLEYS.
PEUGEOT FRERES' FRENCH HORSE CLIPPERS.
SPECIALTIES.
WESTONHOLM'S POCKET CUTLERY AND RAZORS.
WADE & BUTCHER'S BENGAL AND GENUINE
HAMBURG HOLLOW GROUND RAZORS.
JOS. RODGERS & SONS' CUTLERY.
GERMAN COIL AND HALTER CHAINS.
FLYERS, NIPPERS AND TOOLS.
CHESTERMAN'S TAPES.



Peugeot Freres' Barber's Clipper.

Silver Medal, 1878—Paris.



JOHN SPENCER & SON,

Albion Steel Works, Sheffield,

MANUFACTURERS OF

FILES

AND

STEEL,

Table Knives, Razors, Shovels, &c., &c.,

of every description.

CORPORATE MARK.

SPENCER

SHEFFIELD

Granted 1749.

B. WORTH,

RAZOR MANUFACTURER,

Sheffield, England.

FULL CONCAVE RAZORS A SPECIALTY.

Cheapest House in the Trade.

Price lists mailed free on application.

Patented

Hardware.

Horse Hay Forks,

Simple Drivers,

Brackets,

Glass Cutters,

Mining Knives, &c.

Send for catalogue.

American Mining Knife.

Pat. Feb. 11, 1876.

LIGHTNING HAY KNIVES.

WEYMOUTH'S PATENT.



This knife is the best in use for cutting down hay and straw in mow and stack, cutting fine feed from bales, cutting corn stalks for feed, cutting peat and ditching marshes.

The blade is best cast steel, spring temper, easily sharpened, and is giving universal satisfaction. A few moments' trial will show its merits, and parties once using it are unwilling to do without it. Its sales are fast increasing for exports as well as home trade, and it seems destined to take the place of all other Hay Knives.

They are nicely packed in boxes, one dozen each of 50 pounds weight, suitable for shipping by land or water to any part of the world.

MANUFACTURED ONLY BY

HIRAM HOLT & CO.,

East Wilton, Franklin Co., Maine.

For sale by the Hardware Trade generally.

Beardsley Scythe Co.,

Manufacturers of

GRASS, GRAIN & BUSH SCYTHES,

Hay Knives & Corn Knives.

West Windsor, Conn.

Elizabethport Steam Cordage Co.,

MANUFACTURERS OF MANILA, SISAL AND TARRED

CORDAGE OF ALL KINDS.

BINDER TWINE A SPECIALTY.

46 South Street, New York.

A. G. COES
PAT. DEC. 26, 1873

Established in 1839.

A. G. COES & CO.

WORCESTER,
MASS.,

Successors to

L. & A. G. Coes,

Manufacturers of

THE GENUINE

COES

Screw

Wrenches.

PATENTED,
May 3, 1871.
December 26, 1871.
December 28, 1875.
August 1, 1876.

The backstrain when the wrench is used is borne by the bar—not by the handle.
The strongest Wrench made, and the only one capable of re-enforced bar.
None genuine unless stamped

A. G. COES & CO.,

Our Agents, GRAHAM & HAINES, 113 Chambers St., New York, carry a full line of our goods, and will be pleased to serve you at factory prices.

STANDARD
GIRARD WRENCH.
WARRANTED.

FOR
STRENGTH
AND
Durability
IT HAS
NO SUPERIOR.
—
GUARANTEED
IN
EVERY RESPECT.
—
Wrought Bar, Head
and Screw.

Owing to the increased demand for these justly Popular Wrenches, we are now manufacturing more than any other establishment in the world.

Our Wrench having been imitated by other manufacturers, we have adopted the above Trade Mark, and will hereafter stamp all our goods.

SEND FOR
TERMS AND PRICES

GIRARD WRENCH MFG. CO., Girard, Pa.

LANBESON'S
PRICE BOOKS.

Full Leather, \$7.50. Half Leather, \$6.50.
Pocket Edition, Full Leather, \$3.50.
Bolt List, \$1.00.
Screw List, 50 cents.
Revised April 27, 1881.

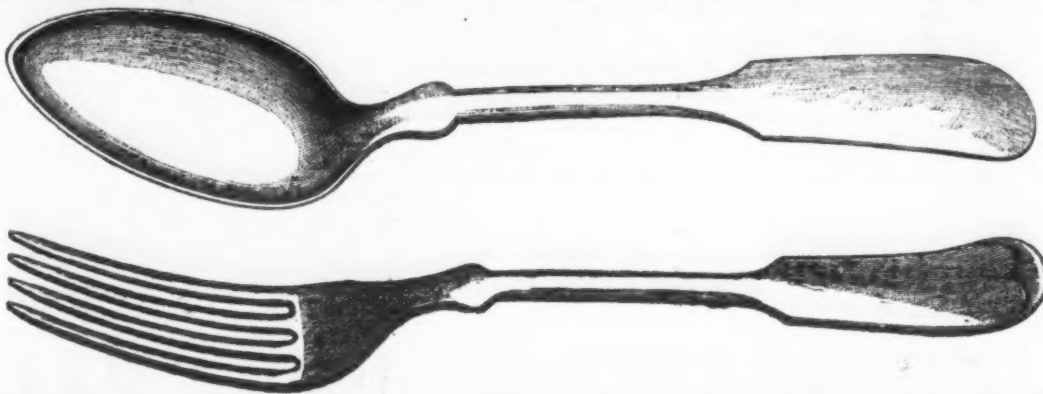
Leigh's Discount Book, \$2.00.
Address all orders to Pope & Stevens, General Agents, 114 Chambers Street, N. Y.
For sale at publisher's price by Wm. Blair & Co., Chicago; A. F. Shippley and Cantrell Hardware Co., St. Louis; C. B. James, Detroit.

GEO. H. CREED,
SHIP CHANDLERY,
103 Reade Street, New York.
Manufacturers of and Wholesale Dealers in
Cotton and "Long Flax" Sail Duck,
Cotton and Linen Ropes,
Creed's Patent Ships' Clews, Holtzman's Wire Rope
Sockets, Agent for Raymond's American Crane Oil
for lubricating Cylinders and Valves.

CHAS. E. LITTLE,
59 Fulton St., New York,
Pump-Log and Tubing Augers
and Fittings,
And Agent for
Barnes' Wood-Working Machinery
and Lathes.
Clements' Steam Hand Saw.
Kimball's Foot-Power Hand Saw.

HALL & ELTON'S GERMAN SILVER.

1837.



1881.

In addition to Spoons of this well-known brand, we are now prepared to furnish Forks of the same quality. We GUARANTEE these goods to be SOLID and of UNIFORM quality throughout, with no coatings to wear through or flake off, and with no liability to RUST.

HALL, ELTON & CO., Wallingford, Conn., and 75 Chambers St., New York.

HOLMES, BOOTH & HAYDENS,

MANUFACTURERS OF

Finest Quality Silver-Plated Spoons, Forks, Knives, &c.

"JAPANESE" PATENTED.



"JAPANESE" PATENTED.

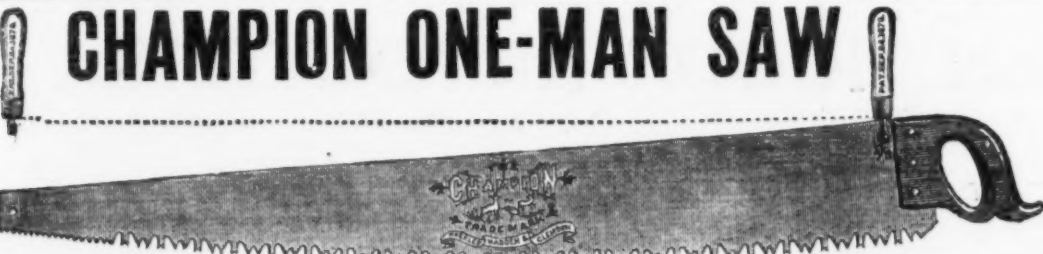
NOTICE.—We guarantee the base of our Spoons, Forks, &c., to be full 12 per cent. Nickel Silver, and extra heavily plated with pure Silver. Our goods are all hand burnished, and are first-class in every respect. We pack our Spoons and Forks one dozen in each box.

49 CHAMBERS ST.,
NEW YORK.

Factories,
WATERBURY, CONN.

18 FEDERAL ST.,
BOSTON.

CHAMPION ONE-MAN SAW



WITH PATENT ADJUSTABLE ATTACHMENT. The only Saw that can be adjusted for either a One-Man or a Two-Man Saw. We make the following lengths, 3½, 4, 4½, 5 feet. Send for sample.

WHEELER, MADDEN & CLEMSON MFG. CO., Middletown, N. Y.

RICHARD DUDGEON,

No. 24 Columbia Street, New York.

Maker and Patentee of the improved

Hydraulic Jacks

AND

Punches.

Roller Tube Expanders and Direct Acting Steam Hammers.
Communications by letter will receive prompt attention.
Jacks for pressing on Car Wheels or Crank Pins made to order.



Our specialty. Also, Castings, Finials and Vases, Stable Fixtures, Hitching Posts, Door and Window Guards, Wrought-Iron Gratings, Fire Escapes and Ladders, Jails, &c. Our fencing can be shipped to any part of the United States, and can be set up by the purchaser at small expense. Our prices are reasonable. Correspondence and notice of public lettings of ironwork solicited. Every Hardware Dealer should have our Catalogue. Address
Office, 31 Water street, near Union Depot, CLEVELAND, OHIO.

NEW DESIGN.

'Miller's 6-Lever'

Cast Brass Padlocks, with or without Tinned Iron Chain or Nickel Plating.

Awarded "First Order of Merit" at the International Exhibition at Melbourne, 1881.

Keys will not pass unless so made to order. The most secure, most durable and cheapest Padlock extant. Master-Keyed Padlocks to order in sets of any number required.

New price lists ready.

D. K. Miller Lock Company

821 Cherry Street,

PHILADELPHIA, PA.



Bergen Port Spelter.

MINES: WORKS & FURNACES:
Lehigh Valley, Pa. Bergen Port, N. J.

The only Miners and Manufacturers of

PURE
LEHIGH
SPELTER

From Lehigh Ore.

Especially adapted for

Cartridge Metal and German Silver.

Also manufacturers of

BERGEN PORT OXIDE ZINC.

superior for Liquid Paint on account of its body and wearing properties.

F. OSGOOD & CO., Proprietors.

E. A. FISHER, Agent, 13 Burling Slip, N. Y.

PHOSPHOR-BRONZE!

PHOSPHOR-TIN!

Phosphor-Bronze is daily gaining favor with manufacturers who have to use a metal of great toughness and durability, of fine grain, high tensile strength and ductility, and is acknowledged far superior to any other alloy on account of the readiness with which it takes a polish, its elasticity, fluidity and beauty of color. Its high price, however, has so far prevented the use of it to so large an extent as its merits would warrant. For the first time an article is offered herewith which makes it easy for everybody to manufacture his own Phosphor-Bronze of the grade it is wanted, by the simple process of melting. This article is PHOSPHOR-TIN. By melting a very small quantity of it with copper an excellent Phosphor-Bronze is obtained at a much cheaper price than the ready-made Phosphor-Bronze can be had in the market. A trial ought to be made by everybody who is using it.

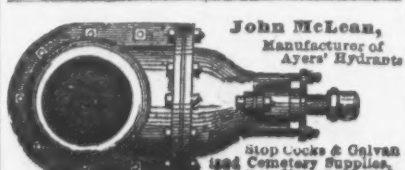
A. KAUFMANN, 36 Park Place, New York,
Sole Agent for the United States and Canada.
For pamphlets please address the above, P. O. Box 2112, New York.

Metal Workers' Crayons.

More convenient and cheaper than either common or French chalk. For manufacturers of all sheet metal, metal workers, machinists, blacksmiths, &c. Send for sample and price list.

D. M. STEWARD,

Sole Manufacturer,
321 State Avenue, Cincinnati, Ohio.



and may, indeed, be more than counterbalanced by the outlays entailed in other directions.

New York Industries.

Mr. Charles E. Hill, Chief Special Agent in this city of the Census Office, has made a summary of the manufacturing industries of New York, excepting the manufacture of cotton, wool, silk, silk goods and mixed textile fabrics, iron and steel, gas, glass, coke, the fisheries, oyster canning and packing, breweries and distilleries, shipbuilding, railroad car repair shops, salt, petroleum, mining and refining and the mining industries of the county, these branches having been assigned to special experts. The summary gives the number of establishments in each branch, the capital invested, the value of the material and the product, the number of men, women and children employed and the wages and hours of labor. The principal industries are as follows:

Business.	Capital.	Material.	Product.
Artificial flowers and feathers.....	\$1,300,000	\$2,872,905	\$5,040,832
Billiard tables and materials.....	315,469	273,443	439,390
Bookbinding.....	2,345,650	2,390,627	4,927,876
Boots and shoes.....	1,944,000	3,663,000	7,451,593
Boxes, fancy and paper.....	678,575	1,051,609	2,204,565
Bread and other bakery products.....	2,032,096	6,016,769	9,405,784
Buttons.....	155,000	167,336	491,647
Carpentering and joinery.....	1,775,684	3,438,571	7,451,528
Cars, street and repairs.....	316,745	269,532	517,527
Cas. faces and wagon.....	1,132,900	1,041,855	2,611,264
Clothing, men's.....	22,396,895	40,219,340	52,756,697
Clothing, women's.....	4,797,095	11,516,494	18,299,487
Coffee and spices.....	1,392,000	4,504,449	5,648,358
Corn and undertakers' goods.....	130,500	525,000	1,098,103
Collars and cuffs.....	688,611	1,244,584	2,464,584
Confectionery.....	1,544,538	3,037,375	4,590,584
Corsets and hoop-skirts.....	179,900	382,661	685,213
Cutlery and edged tools.....	41,900	17,113	28,756
Drugs and chemicals.....	2,090,413	2,690,413	3,108,176
Steel engraving.....	641,415	427,045	2,130,850
Wood engraving.....	7,933	8,138	131,855
Flour and grist mill products.....	1,835,975	2,430,441	6,267,679
Food preparations.....	297,900	328,857	478,941
Furniture.....	4,833,684	4,804,604	8,068,771
Furs (dressed).....	1,650,875	2,643,337	4,474,008
Gas and lamp fixtures.....	1,105,000	965,504	2,494,603
Glass, cut and ornamental.....	5,579,980	815,564	1,747,501
Hairwork.....	134,575	326,640	510,300
Hardware.....	8,744,000	5,042,423	13,786,569
Hats and caps.....	1,024,525	2,095,200	4,234,003
House furnishing goods.....	1,739,000	9,194	23,743
Iron, printing and writing.....	59,000	136,000	181,500
Instruments, professional and scientific.....	209,750	97,430	309,307
Ivory, bone and shell goods.....	361,022	94,915	877,754
Jewelry.....	2,538,326	2,491,607	4,053,781
Lapidary work.....	89,340	128,082	314,492
Lard, refined.....	1,930,000	24,705,908	26,304,756
Leather, goods and leather goods.....	3,181,575	1,180,409	1,619,917
Leather, tanned.....	1,664,546	909,419	1,081,177
Leather, goods and leather goods.....	1,514,491	951,491	1,732,771
Lithography.....	1,204,150	399,360	1,745,452
Looking-glass and picture frames.....	680,150	1,177,497	2,071,665
Lumber, planed.....	891,197	1,154,860	2,202,641
Machinery.....	3,613,343	2,464,147	4,077,076
Machinery, engines and boilers.....	2,821,300	1,111,471	3,213,371
Mattings.....	3,190,000	2,611,414	3,350,780
Marble and stone work.....	2,735,180	2,184,795	5,648,169
Masonry, brick and stone.....	604,000	1,080,430	1,094,741
Men's furnishing goods.....	917,000	1,975,554	3,308,166
Millinery and lace goods.....	1,039,380	2,067,646	4,410,260
Musical instruments.....	114,501	124,501	271,420
Oleomargarine.....	5,500,000	3,710,490	4,500,247
Painting.....	94,214	1,081,119	2,739,453
Paints and materials.....	4,664,378	2,068,897	6,977,921
Patent medicines.....	220,000	469,707	4,300,315
Perfumery and cosmetics.....	377,050	620,000	1,094,700
Photography.....	444,100	343,177	1,140,427
Plumbing and gas fitting.....	661,808	1,801,228	3,807,818
Printing.....	212,650	535,371	1,006,152
Saddlery and harness.....	406,271	404,091	1,097,758
Sewing machines.....	61,900	71,000	860,100
Shirts.....	1,574,700	3,671,215	4,405,015
Silverware.....	1,049,000	608,402	1,547,000
Slaughtering and meat packing.....	1,801,000	18,765,577	20,297,627
Soap.....	2,431,325	2,066,445	3,407,661
Sporting goods.....	710,000	109,000	1,494,415
Stationery goods.....	1,406,000	1,725,117	8,544,264
Sugar and molasses, refined and unrefined.....	2,730,000	10,677,746	11,330,883
Tea and coffee.....	390,508	121,116	768,450
Telephone and telegraph apparatus.....	2,827,697	2,827,697	3,971,071
Tobacco of all kinds.....	5,853,408	8,614,247	10,317,686
Cigars.....	1,840,500	120,000	2,344,013
Toys and games.....	779,500	244,000	791,855
Trunk and suitcase making.....	944,787	1,005,318	2,076,524
Watch and clock repairing.....	171,000	258,111	415,110

In the 11,063 establishments included in the summary, the capital invested amounts to \$157,581,749. The material used cost \$267,042,236, and the product was valued at \$435,422,102. The greatest number of hands employed at any one time was 262,459, of whom 133,998 were males above the age of sixteen years; 63,483 were females over fifteen years of age and 1373 were children. The total amount paid in wages during the year was \$89,513,934.

The Connellsville Coke Trade.

A correspondent of the Philadelphia Press writes as follows from Uniontown, Fayette County, about the great coke country:

The manufacture of coke has become one of the leading industries of Southwestern Pennsylvania, and now ranks well up in magnitude and value with iron and glass. Since the panic has been immense, and is still progressing at a rate that would astonish one unfamiliar with the vast strides which this industry has made since 1870. The financial depression arrested in the measure the rapidity of its growth, but with the return of good times it leaped forward with greater vigor than ever. Within the past two years only the capacity for the manufacture of coke has been doubled. In August, 1879, the number of ovens in operation in the region was 3600. The number of ovens to-day is 7238, of which 6680 are at active work. Many capitalists of the anthracite region of Pennsylvania, Philadelphia, New York and the Mahoning coal district of Ohio have become heavily interested financially in the coke business within the last few years, and as yet have had occasion for naught but self-congratulation.

The history of the discovery of coke and the development of the traffic has never been written. Authentic information of the first use of coke in this country places it in 1817, when it was employed by Colonel Isaac Meason, one of the earliest founders of Western Pennsylvania, in refining iron at the Plum-sock, or Upper Middletown mill, in this county, a few miles from the Youghiogheny River. In 1819 the use of coke was attempted by blast furnaces, but it had to be abandoned because the blast was too light, being only five pounds to the square inch. Even then the value of coke as a furnace fuel was fully appreciated, but the enjoyment of its advantages was prevented by inability to increase the blast. In 1835 William Firmstone manufactured good gray forge iron at the Mary Ann Furnace, in Huntington County, with coke produced from Broad Top coal. In the same year F. H. Oliphant, of Fairbairn Furnace, near Uniontown, exhibited at the Franklin Institute, Philadelphia, samples of iron made from blue lump ore, smelted with coke. In 1840 the Great Western Iron Works, at Brady's Bend, built four coke furnaces. In 1841-2-3 coke was made on the banks of the Youghiogheny River and shipped in flat boats to Cincinnati. A gentleman, who is well informed in all the details of the coke business, says that Dad. Dudley, an English iron manufacturer of the sixteenth century, is entitled to the discovery of coke. He used it for the same purpose to which it is applied now—melting. The manufacture of coke in the Connellsville region did not rise to the dignity of a business until toward the close of the decade of 1850, when it was carried on principally at Dawson's Station, on the Youghiogheny River, six miles below Connellsville, by the Cochrans, who are still in the business, and to most of whom it has brought great riches.

The coal was placed on the ground, either in piles or ridges, and burnt after the manner of a lime kiln. This is known as the Weller process. For many years the entire product was shipped by water to St. Louis. At one time during the war coke brought sixteen cents per bushel. As the demand increased and the trade developed the necessity of better facilities for manufacture became pressing, and eventually the present system of beehive ovens was introduced. These ovens are in form like the old-fashioned Dutch bake oven, except that in the top is a hole, through which the coal is introduced. They are built of fire-brick in rows side by side, the number to a row being limited only by the taste or purse of the owner. The solid stone wall in front and rear conceals their shape. Along the top is a narrow railway track, over which runs the "larry," whose motive power is a smoke-indifferent mule, and whose function is to carry coal from the tippie to the ovens. An ordinary charge for one of these ovens is 100 bushels of coal, which produces 120 bushels of coke. When a charge has been made, the mouth of the oven is closed with bricks, except a few inches' space at the top, left as a passageway for a current of air to the ventilator and as an opening through which to watch the process of coking; then the coal is left to the action of heat and flame. When the smoke and gases have been evolved and the flames have died out the coking is complete. Inside the oven is a great mass of coal, white hot through and through, and a degree of heat that would have appalled the men whom Nebuchadnezzar vainly essayed to roast. The mouth is then opened and hose and water are brought into play. A stream of water an inch thick poured on the flameless mass for an hour without cessation, reduces the heat sufficiently to admit of the coke being drawn. The coke drawer, naked to the waist in summer and the perspiration streaming down his grimy body, pulls the coke out on the ground with a long iron rake weighing from 50 to 60 pounds, to handle which with any dexterity requires considerable practice. The coke, which now has a beautiful metallic lustre, and is hard and firm, is then wheeled a few yards to the car on the railroad siding. The oven is refilled, the mouth reclosed, and the coking of another charge commences. Ignition occurs spontaneously, the interior of the oven retaining such a degree of heat that no fuel is needed to fire the coal. When an oven is first fired wood is distributed plentifully through the coal to impart regularity to the burning. It is a curious fact that after a charge has been drawn and the mouth and ventilator closed, the empty oven will retain sufficient heat to ignite coal spontaneously after two weeks' idleness. This has been demonstrated often when the supply of coal is short, or a strike happens on the part of the operatives.

The following statistics respecting coal and coke will be found concise and interesting:

Number of ovens in operation in the coke region.....	6,680
Number of ovens charged daily.....	3,249
Bushels of coal required each day to fill 3340 ovens.....	334,000
Bushels of coke produced each day from 3340 ovens.....	400,800
Tons of coke produced each day from 3340 ovens.....	8,016
Bushels of coal required to fill one oven.....	100
Bushels of coke produced from one oven.....	120
Value of coke produced of coke, the present daily production, at the present prices.....	\$12,024
Number of cars required to transport 400,000 bushels of coke.....	650

Some furnace companies are interested in coke works themselves. They own or control about 1850 ovens in the region, whose product they consume. Among these are the Cambria Iron Company, the Dunbar Furnace Company, Lemont Furnace Company, Hiram Furnace Company, of Youngstown, Ohio, &c. Deducting 1850 ovens from 6680, leaves 4830 as the number of ovens whose product is sold to outside furnaces and foundries.

There is a wide difference in the value of coking coal in the hill. It is valued by some at ½ cent per bushel, by others at ¾ of a cent, and again by others at a cent a bushel.

FIRMS AND CORPORATIONS ENGAGED.

The list of firms and corporations engaged in the manufacture of coke, the number of ovens owned or operated by each and their railway connections, is as follows, the figures representing the number of ovens:

SOUTHWEST PENNSYLVANIA RAILROAD.	
Morewood Works.....	400
S. W. C. and C. Co.....	100
Mahoning Coke Co.....	100
Connellsville Coke and Iron Co.....	200
Connellsville Gas Coal Co.....	200
Cambria Iron Co.....	400
Kanawha Bank Coal and Coke Co.....	100
A. H. Sherrick.....	100
Sherrick & Wiley.....	100
Dillinger & Rafferty.....	100
Hurst, Stoner & Co.....	100
Southwest Coal Co.....	100
Southwest Coal Co.....	100
Dillinger, Tarr & Co.....	100
J. M. Schoonmaker.....	100
C. P. Markle & Sons.....	100
Markle & Co.....	100
M. F. Overholt.....	100
A. C. Overholt & Co.....	100
B. F. Courtenour.....	100
J. M. Cochrans's Sons.....	100
Charlotte Furnace Co.....	100

H. D. SMITH & CO.,

Plantville, Conn.,

Manufacturers of the

BEST QUALITY CARRIAGE MAKERS' HARDWARE.

Manufacture the Largest Variety of Forged Carriage Irons of Best Material and Workmanship.

PRICES LOW FOR QUALITY OF WORK FURNISHED.

SEND FOR PRICE LIST.

SARANAC HORSE NAIL CO.

Polished or Blued Horse Nails, Hammered and Finished.

The Saranac Nails are hammered hot and the finishing and pointing are done cold. Quality is fully guaranteed. For sale by all leading iron and hardware houses.

S. P. BOWEN, President and Treasurer.

PLATTSBURG, N. Y.

W. S. GUIBORD, Secretary.

ELY & WILLIAMS, Gen'l Agents for Eastern and Middle States, 1232 Market St., Philadelphia; 178½ Water St., New York; 36 Oliver Street, Boston. S. H. & E. Y MOORE, Gen'l Agents for Western States, 163 and 165 Lake Street, Chicago, Ill.

SAM'L G. B. COOK & CO., Agents for Southern States Nos. 67 and 69 (old Nos. 5 and 7) German Street, Baltimore, Md.

SARANAC HORSE NAILS,

Blued or Polished.

Terms, Cash, within 60 Days.

Nos.	5	6	7	8	9	10
Cts.	26	23	21	20	19	18

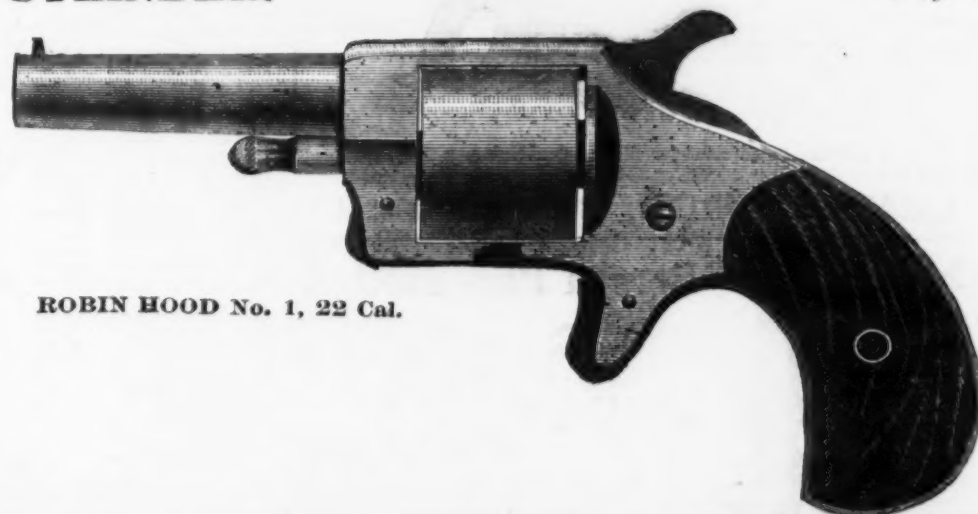
HARTLEY & GRAHAM, 17 & 19 Maiden Lane, NEW YORK,

Agents for the "ROBIN HOOD" REVOLVERS.

STEEL BARREL AND CYLINDER.

22, 32, 38 and 41 CALIBRE.

Cal., Short or Long Cylinder.
Wood, Rubber, Ivory and Pearl Handles.
Plain or Fluted Cylinders.
Round or Octagon Barrels.
Plain Finish, Engraved or Enameled.



ROBIN HOOD No. 1, 22 Cal.

32 Cal. Long Fluted Cylinder.
Wood, Rubber, Ivory or Pearl Handles.
Round or Octagon Barrels.
Plain or Saw Handle.
Plain Finish, Engraved or Enameled.

FOR JOBBING TRADE.

FOR JOBBING TRADE.

WM. ESTERBROOK,
Wholesale Manufacturer of
Coal Hods,
311 Cherry St., PHILADELPHIA.

"BARTLETT" FAMILY PRESS,
With Cloth
Strainer.
A Combined Meat
and Jelly Press.
Size, 6x4 in.
deep.
Price, per doz.,
\$12.
Special terms to manufacturers of tinware.
S. R. Bartlett, 235 Harrison St., Brooklyn, N.Y.

Romer & Co.
Established 1837.
Manufacturers of Patent Scandinavian or Jail
Locks, Brass Pad Locks for Railroads and Switches.
Also Patent Stationary R. R. Car Door Locks.
HANDCUFFS AND LANTERNS.
247 to 249 Railroad Avenue, NEWARK, N. J.
Illustrated Catalogue sent to the trade on application.

AXLES
All kinds Wagon & Carriage Axles
Manufactured by the
LANBERTVILLE IRON WORKS.
LANBERTVILLE, N. J.
Send for prices.

The Boss Lemon Squeezer.

Malleable Iron and
Tinned (pure Tin).



Acknowledged the Best.
Patent Applied For.

JOHN J. TOWER, 96 Chambers St., New York.

ORDER EARLY.

THE KEYSTONE FAST SHACKLE JAIL LOCK

is a new and recently improved Jail Lock, there being as yet but few in the market. They are made of the best malleable iron throughout, highly polished and painted with English vermilion, and have 16 different changes, and are the best finished, the cheapest and best selling Lock in the market.

FLAGLER, FORSYTH & BRADLEY, Agents,
298 Broadway, N. Y.

SOAPSTONE FACINGS FOR FOUNDRIES,

And TALC for Manufacturers of Paper and Rubber Goods.

JOHN G. PORTER, 405 Pearl Street, N. Y.
Agent for A. B. FREEMAN & SON.

CHAMPION
HOG RINGER
RINGS and HOLDER.
Only double Ring ever
invented. The only
Ring that will effectively
keep Hogs from
rooting. No sharp
points in the nose.
Rings 75c. Rings, set, 10c. Holders, 75c. Huskers, 15c.
BROWN'S
HOG AND PIG
RINGER and RINGS.
Only single Ring in
the market that closes
on the outside of the
nose. No sharp points
in the nose to keep it
sore.
EAGLE BULL
CORN HUSKER
is the best Husker in the
market. Farmers say it
is the best. Use no other.
CHAMBERS, BEHING & QUINLAN, Exclusive Manufacturers, Decatur, Ill.

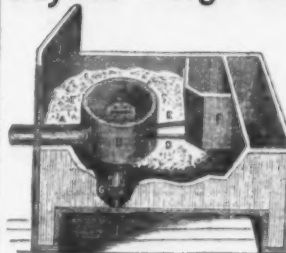
Bemis & Call Hardware & Tool Co.



PATENT COMBINATION WRENCH.
These Wrenches are made from the best of Wrought Iron, with Steel Head and Jaw, case-hardened throughout, and not only combine all of the superior qualities of our Cylinder or Gas Pipe Wrenches, but also all requisite combinations of a regular Nut Wrench, thus making a combination which has no equal.

For Circulars and Price List, address
BEMIS & CALL HARDWARE & TOOL CO., Springfield, Mass.

BROWER & LEEDS, 81 Murray Street, New York,
SOLE AGENTS IN THE UNITED STATES FOR
Bayliss' Forge and Tuyere and Hurricane Bellows.



This Tuyere, either with or without water, will heat iron quicker, better and will last longer than any tuyere now made. Brewster & Co., of Broome St., have 50 of them. They cost but little more than the common tuyeres. The HURRICANE BELLOWES comes ready for work. A 30-inch Hurricane Bellows is equal to a 40-inch pear-shaped bellows, costs less and works with half the labor. They are perfect and warranted.
COLUMBUS, O., Nov. 14, 1880.
JOHN BAYLISS, Esq., 150 E. 54th St., New York City.—Dear Sir: Yours of the 11th inst. is at hand and contents noted. We can say that in our smith shop (one of the very best equipped in the United States) we have about 50 of your Tuyeres in use, and we consider them the best Tuyere irons with which we have acquaintance.
Yours very truly,
PETER'S DASH CO.
JOHN BAYLISS, Patentee and Mnfr.,
STAMFORD, CONN.

THE BUTLER DOOR AND GATE SPRING.
Adjustable, Reversible, Self-locking. Has no Loose Piece. Needs no Wrench. Acknowledged the Simplest and Best Made.

BUTLER DOOR SPRING CO., Cleveland, Ohio.
BROWER & LEEDS, 81 Murray St., New York Agents.
HORACE F. SISE, 100 Chambers St., New York Agents.

THE "BOSS" SCYTHE RIFLE.
Warranted not to scale or glaze. Impervious to water, and not affected by heat. It is the best Rifle now offered.
LEVY L. BROOKS, Manufacturer,
IRVING, TOWNSEND & CO., Sole Agents, 123 Chambers Street, New York.



SPENCER & UNDERHILL,

94 Chambers St., New York, Agents for
American Screw Co.'s Wood Machine and
Rail Screws, Stove and Tire Bolts, Rivets, &c.
G. F. Warner & Co.'s Carriage Clamps.

DEPOT FOR

O. Ames & Son's Shovels, Spades and Scoops.
A. Field & Son's Tacks, Brads, Nails, &c.
Nicholson File Co.'s Files and Rasps.
W. & S. Butcher's Chisels, Gouges, Plane
Irons and Cleavers.
E. W. Gilmore & Co.'s Strap and T Hinges.
Russell Jennings' Auger and Dowel Bits.
Also a general assortment of Hardware.



In attached to the sash easily, without in the
least weakening or defacing it. No holes to be
cut in casings, no attachments thereto, no abra-
sion no matter how long used, nor how severely.
Is never out of order. Address

Universal Sash-Lock Co.,

8, W corner Hamilton and Liberty Streets,
ALBANY, N. Y.

N. Y. MALLET and HANDLE WORKS



Manufacturers of
Calkers', Carpenters', Stone Cutters',
Tin, Copper and Boiler Makers'

MALLETS,

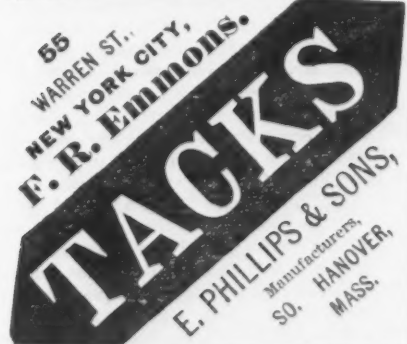
Hawking Bevels, Hawking and Calking Irons;
also all kinds of Handles, Sledge, Chisel and Ham-
mer Handls. Also

COTTON AND RALE HOOKS.
Patented Feb. 19, 1877; a new combination of Hooks.
456 E. Houston St., New York City.

The Perfect Fit Dog Muzzle.



Patent Applied For.
THE MEDFORD FANCY GOODS CO.,
DOG COLLARS & FURNISHINGS,
99 Duane Street, New York.
Send for Illustrated Catalogue.

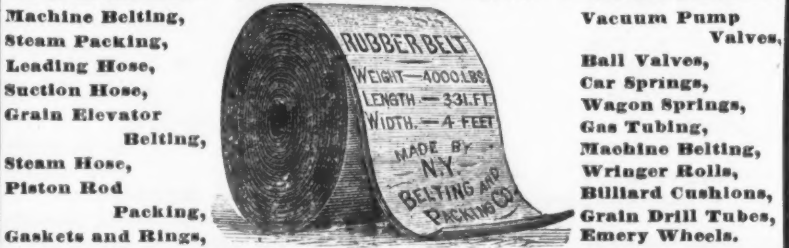


W. & J. TIEBOUT,

Manufacturers of
Brass, Galvanized & Ship
Chandlery Hardware,
No. 38 Chambers St., New York.

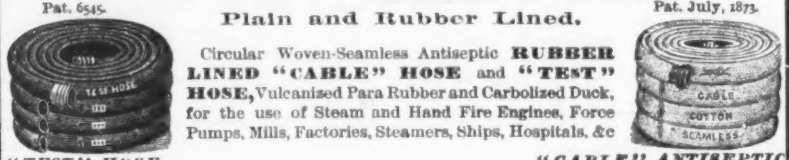
Vulcanized Rubber Fabrics

ADAPTED TO
MECHANICAL PURPOSES.
RUBBER BELTING and PACKING.



This company manufactured the immense DRIVING and ELEVATOR BELTS for the Buckingham
Elevators at Chicago, which have been running perfectly for more than Twelve Years, also those for
Armour, Dole & Co., Chicago, and Vanderbilt's great elevators of the New York Central and Hudson R.
R., New York, being the Largest Belts in the World! We are now making an Elevator Belt 36
inches wide and 2,500 feet in length, which will weigh over 1,000 pounds.

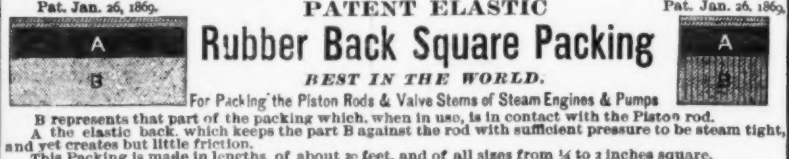
LINEN and COTTON HOSE.



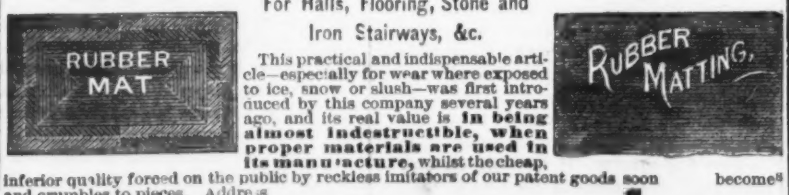
Emery Wheels and Packing.



The properties of these Wheels are such that they can be used with great advantage and economy
for cutting, grinding, and finishing Wrought and Cast Iron, Chilled Iron, Hardened Steel, State, Marble,
Glass, etc. These wheels are extensively used by manufacturers of Hardware, Cutlery, Edge Tools,
Pumps, Safes, Stoves, Fire Arms, Wagon Springs, Axes, Skates, Agricultural Implements, and small
Machinery of almost every description.



Corrugated Rubber Mats and Matting.



NEW YORK BELTING & PACKING CO.,
Warehouse, 37 and 38 Park Row, New York.
JOHN H. CHEEVER, Treasurer.

TACKS & NAILS.

CUT TACKS, SHOE NAILS, WIRE NAILS,
Pat. Brads, Finishing Nails, Clout Nails, Trunk Nails, Hungarian Nails,
Clear-Box Nails, Basket Nails, 2d and 3d Fine Nails,
Carpet Tacks, Upholsterers' Tacks, Gimp and Lace Tacks, Brush
Tacks, Copper and Brass Tacks,
BRASS AND IRON ESCUTCHEON PINS, &c., &c.
MANUFACTURED BY
DUNBAR, HOBART & WHIDDEN, So. Abington Station, Mass.
New York Salesroom, 39 Warren St. Goods made to order from sample.
Particular attention given to orders for EXPORT.

PHOSPHOR-BRONZE.

The Phosphor-Bronze Smelting Co.,



Owners of the
U. S. TRADE MARKS:
Phosphor
Bronze Patents. "Phosphor-Bronze."
Office and Salesroom,
512 Arch Street, - - - PHILADELPHIA, PA.

**THE STRONGEST, TOUGHEST,
BEST AND MOST DURABLE METAL.**

PHOSPHOR BRONZE SPRING WIRE AND WIRE FOR WEAVING, &c.
Pump Rods, Tubes, Screws, Jack Chains,
Rolled Bolts, Nails, Wire Cloth, Sash Cords,
Sheets, Boat Nails, Pens, Wire Ropes,
Plates, Tacks, Sash Chains, Cast Kettles.

INGOTS FOR CASTING.
Send for Pamphlet and Price Lists.
PHOSPHOR-BRONZE.

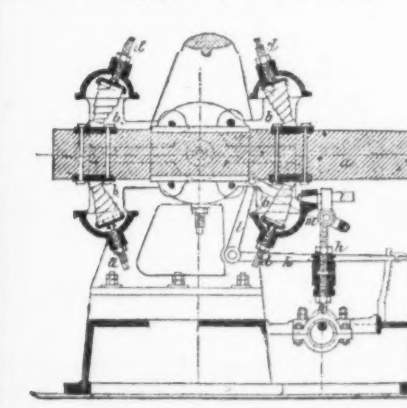
Fairbanks Iron Co.	30
J. W. Moore & Co.	200
Chicago and Connellsville Coke Co.	106
Hogsett, Hanna & Co.	130
Stewart Iron Co.	80
Youngstown Coke Co.	240
Total.	3,415

BALTIMORE AND OHIO RAILROAD.	
H. C. Frick & Co., Henry Clay Works.	100
Frick's Works.	106
Morgan Works.	158
Foundry Works.	84
Eagle Works.	76
Summit Works.	142
Globe Works.	148
Tipton Works.	56
Valley Works.	153
Anchor Works.	100
Fountain Works.	50
A. O. Tinsman & Co., Mt. Braddock Works.	127
Dunbar Furnace Co., Hill Farm Works.	89
S. Colvin & Co.	80
J. M. Reid.	76
Cambria Iron Co.	99
Pittsburgh and Connellsville G. C. and C. Co.	243
A. A. Hutchinson & Co.	175
Hogsett & Rafferty.	201
Mullis Strickler & Co.	82
McClure & Co.	258
J. R. Stauffer & Co.	40
Cochran & Keister.	44
Cochran & Keister.	35
S. Cochran, Sons & Co.	150
Laughlin & Co.	115
J. M. Schoonmaker.	150
Jackson Mining Co.	68
Fayette Coal Co.	100
W. J. Rainey.	40
Cochran & Keister.	100
Newmyer & Co.	304
Percy Mining Co.	40
Total.	3,888

As the Mount Pleasant Branch is con-
trolled by the Baltimore and Ohio Company,
the works located along it are included
among those having a Baltimore and Ohio
connection. The difference between 7238,
the number of ovens listed above, and 6680,
the number in actual operation, is repre-
sented by the number now in course of con-
struction, all of which will be finished be-
fore the summer is over.

A New German Helve Hammer.

Dingler's Journal, in a recent issue, de-
scribes and illustrates a helve hammer made
by Messrs. Th. Kieserling & Albrecht, of
Solingen, which differs in some points from
those of similar construction which have
attained such popularity in this country

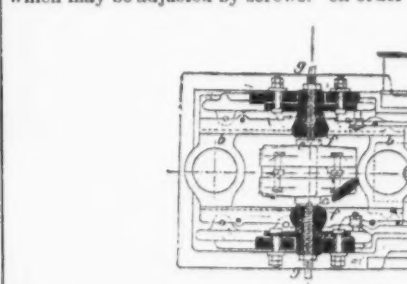


The helve a is not directly moved. It is
attached to a frame, c, as shown in the
accompanying cuts, so that b and c swing
around the same center; a is secured to the
frame b by means of four screws, d, which
each press upon a strong spring. When, in
consequence of the motion of the rod h,
the frame b swings, the hammer will
move with it until the velocity becomes
so great that the inertia of the ham-
mer head compresses the springs, and a
blow upon the anvil is delivered dur-
ing the downward stroke. The swinging
frame b rests in the journals f, the height
of which may be adjusted by screws. In order

shaft the ore is as rich and solid as it has
been found in any other part of the work-
ings. In a north and south direction it
seems that the deposit is as strong as ever,
and of course it is impossible to form an idea
as to how much further it will be found
workable.

A working shaft is being sunk a short dis-
tance south of the present limits of the pit,
and in connection with this a skip road is
being built, which will convey the ore from
the workings up to an elevated tramway,
whose cars will run down and dump them-
selves into ore pockets which overhang the
railway track. This working shaft is now
down to the level of the main working in
the pit, with which a tunnel connects
it at the 40-foot level, and as soon as
the skip road and tramway shall have been
completed the mine will be in shape for an
output of 150 tons per day. A powerful,
direct-acting steam winch for hauling the
skip is already in place, and it is safe to say
that by the middle of July this mine will be
producing on an average not less than 150
tons of good marketable ore per day. The
cost of handling the ore will have then been
reduced to the minimum, and there appears
to be every reason for predicting that the
mine, which has not only been self-support-
ing, but paying well all the way from the
grass roots, is soon to enter upon a career of
prosperity that will far surpass any period
in its past history. Capt. Chas. Mitchell is
mining the ore under contract from the
Bethlehem Iron Company. He is at present
working only about 40 men, but this force
will be considerably increased as soon as the
skip road and tramway shall have been put
in running order.

The Dufferin mine has also been sold for a
handsome figure to the Bethlehem Iron Com-
pany. This deposit is being worked by a
moderate force of men, and is turning out
to be very rich and extensive. A branch
line of railway will reach this mine in a
short time, and meanwhile the ore is being
stocked for shipment. In addition to the
Bethlehem Iron Company there is another
smelting firm whose furnaces are at Johns-
town, Pa., both of which are interested in
the working of these mines, and the average
daily consumption of ore by these two com-
panies is in excess of 2000 tons. They are
also interested in the Nelson Mine, which,



Two New Torpedo Boats.—Consider-
able attention has recently been drawn to
the torpedo ram Alarm, now lying in the
ordnance dock at the Brooklyn Navy Yard.
This ram is one of two experimental vessels
ordered to be built, by a special act of Con-
gress, in 1880, and appropriating \$300,000.
The designing and constructing of one of
the vessels was intrusted to Admiral Porter.

The Iron Mines of Madoc, Ontario.

A correspondent of the Toronto Globe
describes some of the mines at Madoc as
follows:

The lease of the Wallbridge hematite mine
having been sold by Messrs. Coe & Mitchell
to the Bethlehem Iron Company, of Penn-
sylvania, the latter gentlemen have been
pushing forward the development of the
property with more than ordinary vigor.
During the winter some two thousand tons
of choice ore were stocked at the mine, and
now that a branch track has been built by
the Belleville and North Hastings Railway,
this supply is being shipped at the rate of
between 20 and 30 carloads per day. In
the meantime preparations for a large and
unvarying output are being steadily pushed
forward.

The pit is now being worked with a mod-
erate-sized force of miners, and was never
in a more promising condition. The op-
ening measures some 200 feet from east to
west at the surface, and some 90 feet from
north to south. The north and south walls
of the pit are nearly perpendicular, while
those on the east and west are sloped that
at a depth of 30 feet the pit contracts to
about 175 feet. At this depth the whole
floor of the pit is high-grade iron ore, which
when broken requires comparatively little
sorting. In the east end of the pit the floor
has been lowered to a depth of 40 feet over
an area of something like 100 by 75 feet,
and this, too, is all in rich ore. In this sink
again a shaft has been sunk in pure ore to a
depth of 35 feet, and in the bottom of this

The plans for the other were ordered to be
made by Isaiah Hanscom, chief of the
Bureau of Construction. Admiral Porter
designed the Alarm, and Engineer Hanscom
the Intrepid. The object was to build both
for coast defense, of light draught to enable
them to enter almost any harbor, and yet of
such construction and armament as to ren-
der them dangerous opponents. The Ad-
miral decided to build the Alarm of iron, on
the transverse-bracket system, with a double
bottom and water-tight compartments. She
is 173 feet long, 28 feet beam and has 500
tons displacement. She is armored in the
bows with 4 1/2 inches of iron. This is thick
enough to deflect any shot fired from directly
ahead. The vessel has a ram prow, 3 feet
of which is solid iron. A 100-pound spar
torpedo can be run out for 30 feet from this
prow. From its sides similar torpedoes of
50 pounds can be run out 20 feet. The
outer hull of the Alarm is one-half inch thick,
and the inner one one-sixth of an inch.
These hulls are joined together on the trans-
verse-bracket system. The bow is to be
mounted with a rifled gun of heavy calibre,
possibly a 33 ton Krupp gun, though an 18-
ton gun would penetrate 22 inches of armor.
The manner of warfare of the Alarm is
designed to be offensive. The Powder steer-
ing and propelling apparatus at first used on
board this vessel was removed, and the
Malory system substituted for it. The neces-
sary experiments and alterations have been
in progress for many months, at a large
expense, and, as might have been antici-
pated, no small degree of feeling has been
aroused among rival inventors.

The contract for furnishing iron window
frames and sashes for the east front of the
new Capitol at Albany has been awarded by
the Capital Commissioners to Heubelmann &
Co., New York.

The Iron Age

AND
Metallurgical Review.

New York, Thursday, July 21, 1881.

DAVID WILLIAMS . . . Publisher and Proprietor.
JAMES C. RAYLES . . . Editor.
JOHN S. KING . . . Business Manager.

RATES OF SUBSCRIPTION INCLUDING POSTAGE.

THE UNITED STATES, BRITISH AMERICA AND
SANDWICH ISLANDS.

Weekly Edition . . . \$4.50 a year.
Semi-Monthly Edition . . . \$2.30 a year.
Monthly Edition . . . \$1.15 a year.

TO ALL OTHER COUNTRIES.
Weekly Edition . . . \$5.00 a year.
Semi-Monthly Edition . . . \$2.75 a year.
Monthly Edition . . . \$1.37 a year.

NEWSDEALERS OR BOOKSELLERS
In any part of the world may obtain *The Iron Age*
through the American News Company, New York, U.
S. A.; the Wilmer & Rogers News Company, New
York, U. S. A.; and London, England; or the San Fran-
cisco News Co. San Francisco, California, U. S. A.

RATES OF ADVERTISING.
One square (12 lines, one inch), one insertion, \$2.50;
one month, \$7.50; three months, \$20.00; six months,
\$35.00; one year, \$60.00; payable in advance.

DAVID WILLIAMS, Publisher,
83 Reade Street, New York.
PITTSBURGH . . . 77 Fourth Avenue
J. D. WELLS, Manager and Associate Editor.
PHILADELPHIA . . . 300 South Fourth Street
THOS. HENSON, Manager.
CHICAGO . . . 55 & 58 Clark St., cor. Lake
HENRY SMITH, Manager.
CINCINNATI . . . Builders' Exchange
T. T. MOORE, Manager.
CHATTANOOGA . . . Eighth and Market Streets
S. R. LOWE, Manager.
BRITISH AGENCY.
The publishers of *The Iron Age*, 44 Cannon Street,
London, England, will receive orders for subscriptions
and advertisements on our regular terms.

CONTENTS.

First Page.—The Duplex Safety Boiler. Em-
ployers' Liability for Safety to Workmen. Rup-
turing a Boiler by Hydrostatic Pressure.
Third Page.—Papers on Practical Founding—
XXX. Cement for Labels.
Fifth Page.—The Channel Tunnel.
Seventh Page.—The Economic Progress of
England and America. The Northeastern Steel
Company, Limited.
Ninth Page.—Single Cylinder Versus Com-
pound Engines.
Eleventh Page.—New York Industries. The
Connellsville Coke Trade.
Thirteenth Page.—The Connellsville Coke
Trade (Continued). A New German Helve Ham-
mer. The Iron Mines of Madoc, Ontario. Two
New Torpedo Boats.
Fifteenth Page.—A Warning from England.
The Outlook for Merchant Iron. Washed Coke.
Seventeenth Page.—New Publications. English
Trade Unions in 1880. The Commercial Travelers.
Bullion in the New York Assay Office.
Nineteenth Page.—Industrial Items (Con-
cluded). Labor and Wages. Non-Union Labor in
Western Mills.
Twenty-first Page.—Trade Report. General
Hardware. British Iron Market. Iron. Metals.
Foreign Trade Movements. Imports. Exports.
Twenty-second Page.—Exports (Continued).
Coal. Old Metals. Paper Stock. &c. Philadelphia.
Pittsburgh. Chattanooga. Boston.
Twenty-third Page.—Boston (Continued).
Cincinnati. Louisville. St. Louis. New Orleans.
Baltimore. Our English Letter. Foreign.
Twenty-fourth Page.—Foreign (Continued).
Dust Explosions. The Ansonia Clock Company's
New Building. Large Transfer of Property in
Tennessee. Iron Observatory for Boston. The
Missouri Iron Company.
Twenty-fifth Page.—The Iron Age Direc-
tory.
Twenty-sixth Page.—New York Wholesale
Prices.
Twenty-seventh Page.—New York Wholesale
Prices (Continued).
Twenty-eighth Page.—New York Wholesale
Prices (Continued).
Twenty-ninth Page.—Philadelphia and Pit-
sburgh Hardware and Metal Prices.

After an attempt to review the steel-rail
discussion before the American Institute of
Mining Engineers, the *Iron Age* comes to
the conclusion "that American Bessemer
practice, even if slightly ahead of our own
"as regards the product per converter, is
"by no means so exact or so scientific as is
"the same pursuit in the hands of our
"manufacturers. We write subject to cor-
"rection, but we think that at Sheffield
"thousands of tons of Bessemer billets of
"0.40, 0.45 and other percentages of car-
"bon—many of them rail crops too—are

"regularly worked up and yield the results
"expected therefrom with unvarying regu-
"larity and certainty." Aside from the
graceful admission that we are "slightly
ahead" in production per converter, the
delicate hint on the part of the *Ironmonger*
that the Sheffield people are doing such
wonders in making steel uniform in carbon,
is amusing. A glance at the figures pre-
sented by Capt. Jones, in the paper read by
him recently before the Iron and Steel In-
stitute, will quite suffice to settle that point.
It is, however, to the evidently complete
misunderstanding of the issues of the steel-
rail discussion that we wish to direct the
attention of our valued contemporary. No
one has expressed a doubt that American
rail makers are not able to control their
process in such a way that a uniform pro-
duct will be obtained from one week to the
other. The question was whether a given
chemical composition of the rails, as deduced
from an examination of the wear of a
number of specimens by Dr. Dudley, would
insure to consumers a material which would
do maximum service. Dr. Dudley holds
that the evidence obtained warrants the
adoption of certain specifications for steel
rails; the producers differ from him on
that point. Incidentally many important
questions were raised, such as the effi-
ciency of certain methods of analysis and
the trustworthiness of a class of chem-
ists, but nowhere in the whole discussion is
there a statement that could be tortured
into the conclusion which the *Ironmonger*
has reached, nor is there anything to war-
rant its being "read between the lines."

A Warning from England.

The *Pall Mall Gazette* of July 11th, in a
leading article headed "The Nearness of a
Financial Crisis in the United States,"
argues that the stability of the New York
money market depends upon its power to
continue drawing gold from Europe. An
excess of exports over imports is not nec-
essarily a sign of wealth; a nation that
always exports more goods than it imports
is nearly always a debtor nation, and its ex-
cess of exports is needed to pay its debts.
Whether the process of expansion by drain-
age from Europe, which, within the last
two years, has added \$65,000,000 to the
circulation of the Union, is to go on,
depends, the *Gazette* thinks, upon the ability
of America to control with its produce the
markets of Europe. The indications are
that the European harvest will be bountiful,
and that the United States will have to face
great competition, probably at very low
prices. With an overwhelming surplus yield
they might be able to do this, but should
their surplus be, as many allege, compara-
tively small, the difficulties of their trade
may well become serious. The article con-
cludes as follows:

We think the position of the United States is
not anything like so secure as the more sanguine
Americans assume. They are just in the circum-
stances where a financial crisis might develop
with extraordinary rapidity. Some look for such
a crisis in the coming autumn, but we are by no
means certain that it will develop itself then,
even should things come to the worst. With their
trade, the credit bubble may go on swelling for
months beyond the time when cautious men look
for trouble. Holders of United States securities,
however, must lay their account for serious finan-
cial difficulties much sooner than the contempla-
tion of the wonderful progress of the past three
years might lead them to expect.

This well-meant warning of our English
contemporary evidently aims at our money
market in its connections with and bearings
upon the New York Stock Exchange. We
readily admit that the influx of surplus funds,
—i. e., the excess of exports over imports dur-
ing the past few years, whether such excess
was coming to us in the shape of gold or any
other representative of ready cash—has ten-
ded to ease the money market and facilitated
the inflation of all sorts of stocks and min-
ing securities at this center, where the bulk
of such surplus available funds remain float-
ing until they gradually find their way into
legitimate permanent investments. While
this has been the case, the value of stocks,
whether dividend-paying or not, has been
advanced beyond reason. They are there-
fore ready for a great reaction; indeed, they
have been so for months past, and a serious
assault upon them would no doubt create a
stampede verging upon panic. A few strong
cliques can accomplish this in the bear in-
terest. They would not need a tight money
market to bring it about; the manifest want
of confidence on the part of the gen-
eral public in present unduly inflated prices
would suffice. A tight money market, coin-
cident with a "bear" assault, would, of
course, help very materially to precipitate a
great fall, but the apple is ready to drop, in
our judgment, without such extra pressure.

Fortunately, however, Wall street is one
thing, and the general condition of the
country and its trade is another. It is nec-
essary, therefore, to examine, in the first
place, whether a smaller grain crop here
and a more abundant one in Europe than
they have had there for three years, would
be likely to turn the so-called trade balance
against us. In the second place, it will be
necessary to show that in the legitimate
channels of trade there has been, for the
past eight months at least, no undue, un-
healthy speculation and inflation to pave the
way for a crisis properly so called.

People in Europe harp altogether too
much, it seems to us, upon the cereal por-
tion of what we send them from here. Im-
portant as the amount of breadstuffs is
which we ship thither, we send them such a

variety of goods, which they are compelled to
draw from here to a notable extent, that the
aggregate amount of our exports thither, as
well as to South America, &c., would, after
all, not be so very materially diminished
were we to ship them a reduced amount of
breadstuffs. A few figures from the latest
federal statistics—i. e., those for the first ten
months of the fiscal year ended June 30—
will suffice for purposes of demonstration,
limiting ourselves therein to the leading
articles we ship to Europe principally, and
reducing values to thousands of dollars:

DOMESTIC EXPORT—TEN MONTHS.		FISCAL YEAR.	
	1880.	1881.	1880.
Wheat, bush.	1,214,668	1,214,668	1,214,668
Rye, bush.	25,000	25,000	25,000
Barley, bush.	1,214,668	1,214,668	1,214,668
Oats, bush.	1,214,668	1,214,668	1,214,668
Flour, bush.	1,214,668	1,214,668	1,214,668
Apples, bush.	1,214,668	1,214,668	1,214,668
Oranges, bush.	1,214,668	1,214,668	1,214,668
Wool, pounds.	1,214,668	1,214,668	1,214,668
Iron, pounds.	1,214,668	1,214,668	1,214,668
Steel, pounds.	1,214,668	1,214,668	1,214,668
Other goods.	1,214,668	1,214,668	1,214,668
TOTAL.	1,214,668	1,214,668	1,214,668

The export of goods we have specified
amounted during the first ten months of the
last fiscal year to \$66,375,000, against \$59,703,000
during the corresponding period of the
previous year, and corn, rye, wheat and
flour bore therein the following proportion:

1880.	1881.
\$24,725,000 33 per cent.	\$23,425,000 39 per cent.

whereas the proportion of the four articles
in the general domestic export was only 30
per cent. in 1881, against 34 per cent. in
1880.
Supposing that, instead of at the rate of
\$22,000,000 per month, we ship of the four
articles of food only half that much, or
\$11,000,000 less under that head during the
fiscal year just begun, the table we have
given would still reassure us, in view of the
enormous increase of export during the ten
months of 1881, independently of the four
articles, of \$79,964,000, which, at the rate of
\$7,996,400 per month, would be equal in a
year to \$95,956,800, if it went on at the
same rate, and there is no reason why it
should not. The fact is that our resources
are so manifold, and the range of our indus-
tries of all kinds is so well distributed over
the vast expanse of our magnificent continen-
tal dominion, that it will affect our home
and foreign trades comparatively little if in a
year we ship, out of the 2,714,602,000 bushels
of grain we produced last year, or the 2,500,000,000 we
shall probably produce this year, 125,000,000 bushels
more or less. In 1870 we only produced
1,387,295,000 bushels, and in 1860, 1,229,039,000;
in other words, to years sufficed to
double our grain production. Our European
friends should understand that a crop failure
of a general kind, in the Euro-
pean sense, is an impossibility on this side, for
our expanse of land and our range of cli-
mate are too great, while our facilities of
marketing are, we believe, unsurpassed.

As to the soundness of the general situa-
tion of trade, we would remark that since
the coffee failures last fall there has been no
speculation in merchandise worth speaking
of that we are aware of, except in hog pro-
ducts, but even the latter could not have
been kept up had it not been that the pro-
duction had fallen short of the home and
foreign demand. In fact, the article was so
well situated that even the "trichinosis
raid" upon it had not much of an effect
beyond a few days' weakness. The real-
estate speculation, stimulated to a degree by
a large immigration, has, so far as we are
able to judge, not yet assumed any danger-
ous proportions. Prices of merchandise, with
the sole exception of hog produce, are on the
whole moderate; even cotton is not dear,
and in a great many instances goods are
positively low; there are comparatively
few failures, the last eight years having
pretty thoroughly cleared the business world
of unsound elements, and we cannot discover
any indications of an approaching crisis like,
for example, the one of October 1857, when,
subsequent to the gold discoveries in
California and Australia, such mercantile
staples as sugar had quadrupled in value.
We can, therefore, take the predictions
of the English press with some allowance
for the fact that it is scarcely possible for
them to see things in this country as they
exist.

Those who have read Lord Beaconsfield's
"Eudymion" will remember the advocacy
of protection by its hero and his party. It
begins to look in England as though this
was not only history, but prophecy. The
present Conservative party was the party of
protection, and lost power in the corn-law
times by its tariff principles. The indica-
tions are that its present leaders will return
to the protective principle under the thin
disguise of reciprocity. The speech of Lord
Salisbury in the debate on the sugar duties

on July 7th is believed, notwithstanding an
absolute denial, to foreshadow the Conser-
vative purpose to offer the British manufac-
turers protection.

The Outlook for Merchant Iron.

Since our last editorial review of the posi-
tion and outlook for iron appeared in these
columns, the market has assumed a more
healthful tone. The better feeling among
makers of pig iron is probably largely
attributable to the advance in ocean freights;
but it is interesting to note that importers
are quite as hopeful as makers, and are ex-
pecting to profit fully as much by the in-
creased demand as are the furnacemen. A
restricted production in England, of which
our London correspondent speaks this week,
may in time place some restriction upon the
shipments to this country, but for the present
they are likely to continue liberal, and we
are not sure that the improvement in the
outlook will be of ultimate benefit to the
makers of pig iron, as it will undoubtedly
tend to maintain cost at figures which will
leave but narrow margins, if any. How-
ever, we must take things as they come,
and it is undoubtedly true that the market
is looking much better than it did a month
or six weeks ago. For manufactured iron
and nails there can be no doubt that the
condition of the market is a great deal better
to-day than it was a month ago, and that it
is steadily improving. This is true, not only
as regards the amount of business done, but
the price received as well. Manufactured iron
is from \$4 to \$6 higher in price—some kinds
even more than this—and nails are 10 cents
to 20 cents per keg higher. The demand
both for futures and immediate delivery is
very heavy. Large consumers are pressing
their orders for fall delivery, and even in
all cases, being able to get quotations for de-
livery beyond 60 days. There is also a great
urgency for immediate delivery, and some
iron is sold at one-tenth higher than rates
ruling for near futures if deliveries can be
made at once. In a word, with the exception
of a few months in the midst of the
"boom," there has been no such demand for
years. In view of this fact, it is well to
stop and ask what has made this demand,
it is likely to continue, and what will be its
effect on prices?

As to the first point, we have gone over
the reasons so often that it is only necessary
at this time to refer to them briefly. The
chief reason is the general prosperity of the
country, a prosperity that is both stable
and healthy. Labor is everywhere fully oc-
cupied and the demand is in excess of the sup-
ply. "We feel the scarcity of skilled labor,"
writes one of the largest Eastern employers
of labor in iron works, and adds the most
surprising statement, "but not to the ex-
tent that we feel the scarcity of unskilled."
When everybody is at work, skilled and
unskilled, when the demand is so great that
our Western roads offer employment for
two years to 10,000 unskilled workmen, it is
an evidence of prosperity of which there
could be none better. Capital in the great-
est abundance is seeking investment, and
even taking large risks, with little fear of
the future. With this busy and prosperous
labor, with capital seeking employment,
new enterprises are undertaken, old ones
are enlarged and extended. Our exports
are greater than our imports. We are no
longer a debtor nation. The wonderful
immigration that is pouring to our shores adds
to our wealth and increases our prosperity.
Carey once said, in effect, that the most
highly organized and expensive article to
produce was man, and the old world is pro-
ducing men at its own cost and sending them
here, without any expense to us, to add to
our wealth and prosperity. These, gener-
ally speaking, are the causes of the pre-
sent improved condition of the trade. The
causes of the demand that has just made
itself manifest are somewhat in addition
to these. In the first place, the char-
acter of the spring weather delayed trade.
Again, every merchant, almost without
exception, and many large consumers as
well, have bought from hand to mouth, in
expectation that iron would be lower, or
waited to see if it had reached its lowest
point. This seems to be settled now, and
orders are being rushed in. It is also true
that for the past two years the fall trade
has opened earlier than in former years.
Whether this indicates a permanent change
in the course of trade, or only a temporary
one brought about by the circumstances of
the country, it is difficult to say. The prob-
abilities point to the latter view.

Is the demand likely to continue? For
the present year the indications are that it
will continue. The enterprises undertaken
are so immense that it is not possible to com-
plete them this year, or, except in the face
of some overwhelming financial convulsion,
to stop them and their demand for iron.
The trunk line war in freights may interfere
with prosperity by creating a lack of confi-
dence, but if, as many believe, it is a stock-
jobbing speculation, its effect has been dis-
counted. What effect will this demand have
upon prices? There is no doubt that prices
will rule higher by August 1st than to-day;
how high, it would be the merest conjecture
to say. Two weeks ago last Wednesday, a
meeting of the Western Iron Association
was held, at which the belief was expressed
that 2.30 could be maintained. At the meet-
ing last week it was evident that some mills
had found no difficulty in getting still better
prices. We do not believe, however, that the

course of the market two years ago will be
repeated. At the present rates of English
marked bars, they can be imported into the
country at 2.60 to 2.70, and this will be
some indication of the limit that will be
made, though it is probable that were this
limit exceeded for a time, it would not result
in bringing in much bar iron. The experi-
ence of importers for the past two years is
against speculative importations. We should
not be surprised, however, to see iron sell-
ing freely at 2.50 East and 2.60 West, as
the lowest rate, before many weeks.

Washed Coke.

Something of a discussion has lately arisen
in the Western Pennsylvania papers regard-
ing the merits of washed coke. In the
course of the discussion a Connellsville
paper made the following statement, which
has been traveling the rounds. "It is too
well known that the coke made from the
"washed coal is more expensive, and at all
"times an inferior furnace fuel compared
"with the first grade of the Connellsville
"coke." It is true that the washing of
coal adds somewhat to the cost of coke, but
not as much as is generally supposed, the
cost with approved appliances and ma-
chinery, including handling, being but a
few cents per ton. But it is not true that
coke made from washed coal is more expen-
sive than Connellsville coke. As the rule,
and one which holds good in Pennsylvania,
the coal that is washed for the manufacture
of coke is slack, having little or no value,
which is, or has often been, sold delivered
on cars at the cost of loading—say, \$2 a car
of 12 to 15 tons. Now, with as cheap ma-
terial as this to start with, and the slight
expense of washing added and some cost for
cooking, the expense cannot be as great as
Connellsville coke.

Nor is it always true that a coke from
washed coal is an inferior furnace fuel.
Indeed the rule is just the opposite. A
washed coke made from a given coal is in
most cases better than the unwashed. It is
true that washed coke made from other coal
is not as good as the unwashed coke made
from Connellsville coal, but it is a question
if washing Connellsville coal would not give
us a better coke. Even the best Connellsville
coke contains a much larger amount of
ash and sulphur than Durham, and both
could be lessened by washing. The ash
usually credited to Connellsville coke is 10
to 12 per cent. This could be reduced to
7 or 8 per cent., or lower, perhaps, by proper
crushing and washing. The sulphur in
Connellsville coke could probably be reduced
two-thirds by washing. We do not intend
in what we have said to disparage the char-
acter of Connellsville coke; all things con-
sidered, it is the best furnace fuel in this
country; but as in the nature of things it
must cost more in the near future, it is a
subject that should be seriously considered
whether the reduction in ash and sulphur
that will result from washing will not make
a fuel enough better to pay all its costs, and
more too. Certainly there would be an
economy of fuel, a more regular-working of
the furnace and a superior product.

The frequency of cyclones and tornadoes
in our Western States makes the question of
providing for wind pressure in engineering
structures a particularly important one in
this country. These destructive winds have
a very narrow path, as a rule not exceeding
50 to 60 feet in width. While their general
direction is approximately a straight line,
they oscillate irregularly to the right and
left and vertically, so that the width varies,
and the tornado for a time jumps upward,
leaving the surface of the ground. They
have at the same time a very strong gyratory
motion on their axis, by the action of which
they exert a strong upward pressure, carry-
ing roofs and other articles high into the
air. There are cases on record where bridges
have been actually lifted away from their
piers, going to prove that it was not
lateral pressure, but vertical pressure, that
wrecked them. The problem of estimat-
ing the forces thus at work and their
peculiarities, and of providing against their
destructive action, is a difficult one, and it
is with satisfaction that we note the efforts
made by the Society of Civil Engineers to
solve it. A paper on the "Wind Pressure
upon Bridges" was read recently by Mr. C.
Shaler Smith, and in it and the discussion
following it, in which many eminent engi-
neers participated, we find the best practical
data available on the subject. From the
examination of cases on record of the de-
struction of bridges, and the overturning
and derailment of trains and cars by wind
pressure, Mr. Smith concludes that 30 pounds
per square foot may be considered sufficient
for a working specification, the bracing
being proportioned for that pressure on a
surface of a train averaging 10 square feet
per lineal foot and twice the vertical sur-
face of one truss. The 300 pounds pressure
per lineal foot due to the train he treats as
a moving load, and the pressure on the
trusses as a fixed load, iron in tension being
taken as 15,000 pounds per square inch, and
in compression with a factor of safety of 4.
These specifications represent approximately
the best practice of our American railroads
and bridge companies, and, if followed, hold
out every assurance that, except in the
most violent tornadoes, the structures are
safe.

Our English friends are getting anxious
about our finances, and are beginning to see
that in our enormous surplus revenues there

may be an opportunity that will favor a reduction in our tariff. The correspondent of the *New York Tribune* telegraphs, under date of July 9th: "The *Economist* again criticizes the debt reduction policy of the American government, and calculates that the present unprecedented surplus will probably be increased during the ensuing twelve months. It contemplates the probability of the whole outstanding debt being converted before many years into three per cent. bonds. It urges that taxation is kept needlessly high, because the lowering of the interest is not dependent on maintaining the present rapid rate of payment. The *Economist* makes all this the basis of an argument against the tariff, desiring to apply the surplus revenue to the reduction of the import duties rather than the reduction of the debt." There is no doubt but some such argument as this will be used as a reason why the tariff should be reduced. Protectionists have seen this for some time; but there are other alternatives than those the *Economist* suggests. For example, the internal revenue receipts can be very much reduced—the bank check tax, patent medicine tax and whisky tax. There is a large, respectable and growing party in this country that question the propriety of supporting this government by a tax on whisky. The difficulty of its collection, the trouble and deaths connected with the enforcement of the laws against illicit distilling, have led many to think that the internal revenue can be reduced and the duties maintained, and our surplus revenue not remain so large.

Grievous complaints are made by official inspectors and appraisers at the Custom House in this city, as well as by steamship companies and passengers arriving from Europe, of a secret system of espionage over all baggage landed at this port. The chief agent is described as a German, formerly a runner for the Pennsylvania Railroad Company, but who was discharged, and immediately reappeared as a full-fledged government official under the Collector, but exercising authority superior to the regular inspectors and appraisers. Baggage already regularly examined and passed is liable to be intercepted, wherever found, and the owner subjected to serious detention and losses. Among the sufferers named is a member of the British Embassy in Yokohama, the late Republican candidate for Governor in a neighboring State, a well-known banker and railroad manager, a lady whose benevolence is known all over the country, &c. When the new Collector, Senator Robertson, assumes the duties of the office, he will doubtless give this subject the attention which it deserves.

The Montreal Board of Trade are greatly agitated by the prospect that the Canadian lines of telegraph will be absorbed by the Western Union of the United States. A resolution, unanimously adopted last week, declares that such an arrangement will tend to the great injury of the interests of Canada, and the president of the board said: "The proposal to hand over all the telegraph wires of the Dominion in the way indicated, amounts practically to an attempt to rob the Dominion of the sum of \$300,000 or \$400,000, invested by the government in extending the telegraph system of the Gulf and its islands for the benefit of Canadian commerce and fishing interests, by putting these works at the control and mercy of men whose chief interest is to enrich themselves, and who would naturally first see that all valuable shipping and meteorological information should be used for United States interests." The Canadians are becoming very sensitive to alleged Yankee encroachments on their side of the line.

The Treasury Department has rendered a decision of some interest to importers of scrap iron, which, we think, will scarcely stand the test of judicial scrutiny. Certain Philadelphia importers appealed from a decision of the Collector at that port, requiring the payment of \$3 per ton duty on so-called "dirt," imported as part of a lot of 520 tons of scrap iron. They claimed that although this was weighed in with the scrap in discharging the vessel, it was of no value, being simply rust which had scaled off during the voyage. The Department holds that it is not "dirt," but oxide of iron, and that in iron yards this is carefully preserved and sold for commercial purposes. Although admittedly not worth as much as scrap iron, the Department rules that it is dutiable at \$3 per ton. Now, it requires no argument to show that this loose stuff is not scrap iron, whatever else it may be, and that it should not be classed as such. The tariff specifies several kinds of iron oxides, each at a different rate: venetian red dutiable at 25 per cent. ad valorem, and oxide of iron, as a medicinal preparation, dutiable at 40 per cent. ad valorem. The fact that this rust started as scrap iron does not make it scrap when it gets here, as it has changed its character and is much nearer to an ore than it is to iron. Moreover, it has gained in weight by this change, and if all this loose stuff is to be weighed in, it might, in a rigid interpretation of the law, in the light of this decision, falsify the invoice. The question is an interesting one.

The title of Mr. John Birkinbine's valuable paper on "Blast Furnace Hearths and

Linings," printed in *The Iron Age* of July 7th, was unfortunately made to read "Blast Furnace Hearths and Chimneys." This was an error of the types not readily explained, as the words "chimneys" and "linings" bear little resemblance to each other when written.

NEW PUBLICATIONS.

ANNUAL REPORT OF THE SECRETARY OF INTERNAL AFFAIRS OF PENNSYLVANIA, PART III.—INDUSTRIAL STATISTICS. By Hon. Miles S. Humphreys, Chief of Bureau, Harrisburg, Pa.

The Annual Statistical Report of Pennsylvania is, as usual, full of interesting and valuable matter. Mr. P. U. Shaefer, of Pottsville, in a paper embodied in the volume, continues his vigorous crusade against the excessive waste of coal in mining, and we notice in other portions of the report similar efforts to call attention to a great evil. Mr. Shaefer has agitated the subject before and is entitled to credit for what he has done, but we fear that there is little chance of any improvement until the coal operators are taught that it will pay them to take out a larger amount of coal with less waste. Let the loss be "fearful" will be conceded. That Mr. Shaefer and those who agree with him begin the good work of showing how it is to be avoided. Mr. William Wilcox, Inspector of the First Bituminous District, speaks of the same subject, but more directly with reference to bituminous coal. He makes some very good practical suggestions. Let Mr. Shaefer do the same. Mr. William E. Richards, Inspector of the Third District, in discussing the fact that many mines are ignorantly and recklessly managed, speaks incidentally, too, of the waste. He urges that the mines should be placed in charge of competent men, and undoubtedly touches a sore spot in doing so, but his suggestion that the State appoint an examining bureau to examine candidates as to their fitness to take charge of and conduct underground work, is of doubtful value. Such a method of dealing with the difficulty would not be likely to be effective. The fact that the State possesses a great interest in a proper working of its collieries, would not entitle it to direct interference in the manner in which they are worked. It can do much, however, by encouraging the development of training schools for inside bosses and foremen, such as that now so successfully started at Drifton by Cox Bros. & Co., under the guidance of Mr. Oswald Heinrich, who undoubtedly takes rank among our best practical mining engineers. Mr. Shaefer and the inspectors can do very much good if they will follow out this matter persistently, but they must distinctly understand that legislation will not do it. Among the other interesting subjects brought up in the report, outside of the usual statistical data, is a paper on the "Textile Fabrics," from the pen of Mr. Lorin Blodgett, whose ability in this special field is recognized. The statistics on wages are much more complete than usual, and the returns made by employers themselves are of very great interest. Running over the figures, we notice that the income of the workmen at our iron and steel mills averages very high, being frequently above \$1000 per annum, although very often they do not work full time. Mr. John H. K-r contributes a valuable paper on "Building and Loan Associations," and in connection with it the department has gathered interesting figures on the capital, resources and liabilities of these societies, which have not until now been presented in so complete a form. The mine inspectors' reports in general show satisfactory progress, and contain descriptions of new appliances, among which we would mention S. Diecher's coal-washing machine. The report concludes with a collection of the labor laws of Pennsylvania.

L'INGENIEUR. Published by M. Bernard, Paris.

The well-known English technical journal, *Engineering*, has met with such appreciation in France that M. Bernard has concluded to reproduce in French, in a special journal, a selection of its articles, to which it appears, from its first number, original correspondence and articles are to be added.

English Trade Unions in 1880.

During the last five years the British trades' unions have experienced a pressure more severe than has ever before fallen to their lot; their resources have been strained to the utmost, their stability has been subjected to a searching trial, and their capability for dealing with difficult problems connected with labor has been tested to an extent hitherto unknown. The ordeals through which they have had to pass have also sorely tried the efficiency of their modes of management, and put to the test the whole of their internal economy. The first three years of the great depression in trade through which that country has been passing—namely, 1876, 1877, and 1878—were sufficiently trying; but the year 1879 exceeded each of the others in its severity. It seemed, indeed, at one time, that it would undermine their very foundations, and reduce them to mere wrecks, as compared with their former wealth and strength. In that year, however, the lowest point was reached, and 1880 brought with it some relief and helped to restore partial confidence.

Five societies are examined by the statistic by way of example, for the simple reason that in their constitution, organization, and method of government, they are almost identical in all essential particulars, while their rules, contributions, payments for benefits and the like, are very similar. In the first place, they are all what is now called amalgamated societies; that is to say, they have each a network of branches all over the country, with central offices and a governing council. Secondly, the rules as to membership, qualification, admission and conduct differ but very slightly. Thirdly, the rates of contribution are the same—1/- per week—in all cases except one, that of the steam engine makers, with whom the contributions are 9d. per week. In the matter of levies their action is much the same. Fourthly, the benefits vary somewhat in amount, but not materially, as will

be seen further on. The numerical strength of the five societies selected, at the close of 1880, was as follows:

Name of society.	Branches.	Members.
Amalgamated Society of Engineers	403	44,593
Friendly Society of Ironfounders	113	17,247
Boiler Makers' and Iron Shipbuilders' Society	171	18,388
Steam Engine Makers' Society	85	4,134
Amalgamated Carpenters' and Joiners	354	17,754
Totals	1,126	95,225

This shows an increase of 20 branches and of 1719 members during the year, one society only showing a decrease—the ironfounders. The net income and total expenditure of the five societies were as under:

INCOME.	£	s.	d.
Amalgamated Society of Engineers	120,047	15	6
Friendly Society of Ironfounders	45,935	17	9
Boiler Makers' and Iron Shipbuilders' Society	48,153	9	8
Steam Engine Makers' Society	8,272	11	10
Amalgamated Carpenters' and Joiners	42,773	8	1
Totals	275,583	5	4

EXPENDITURE.	£	s.	d.
Amalgamated Society of Engineers	130,000	2	1
Friendly Society of Ironfounders	47,301	3	9
Boiler Makers' and Iron Shipbuilders' Society	34,054	3	9
Steam Engine Makers' Society	3,552	19	1
Amalgamated Carpenters' and Joiners	49,566	9	3
Totals	275,564	9	8

These totals show a decrease of income on the year of £2676. 3/11, but this decrease was the result of fewer levies. The expenditure shows the enormous decrease of £107,494. 3/9. Nevertheless, the expenditure exceeded the income by £81. 7/4, so that the strain, though lessened, is not entirely gone. The particular point where the pressure of that strain was the most intense will presently appear.

With regard to benefits, the societies under review excel all others. In one respect they are unique, namely, in the provision they make for the relief of members out of employment. In the whole range of benefit societies or insurance corporations there is nothing like it or approaching to it; and it must be borne in mind that all benefits are covered by a contribution of 1/- per week, except in the event of there being exceptional demands on the funds, in which case temporary levies are put on. The amounts provided for in the rules and guaranteed of the several benefits are given in each separate table, side by side with the gross payments of each society for the past year.

The term used in most societies for out-of-work allowance is "donation." This form of relief is usually divided into two classes, called, respectively, "home donation" and "traveling relief." Latterly, allowance is granted in another form as well—namely, in payment of fares to situations or jobs at a distance—a most useful provision, for it assists migration. In former times "traveling relief" was the only form of relief granted. Now, however, "tramping in search of employment" is not so general as it used to be, and the system is discouraged to a certain extent. And no one need wonder that it is so, for tramping had degenerated into an organized system of "cadging," and the funds of the society were requisitioned to support "professional tramps." Even now the class is not quite extinct. During the recent depression in trade both migration and emigration were equally fruitless, for work was scarce and labor plentiful, not only in the United Kingdom but all over the world. Home donation, with payment of railway fares in the event of a job being offered, is now fast superseding the old method of tramp relief, the evils of which had long been recognized, and it has this advantage over the latter practice—namely, the wife and family of the member are able to share the allowance, whatever it may be; whereas, under the old system, the entire amount granted barely sufficed to keep the traveler day by day.

The Commercial Travelers.

The National Commercial Travelers' Association met in Detroit last week, the president, Mr. James H. Eaton, of Syracuse, in the chair. Mr. Eaton in his opening address said:

We connect the producer, the importer, the jobber, the manufacturer, with their customers. We enable a party to have exhibited their goods, wares and merchandise, not to two, five or ten customers in a day, but to a hundred or a thousand. We display to a dealer in a small town far from the great thoroughfares and arteries of traffic samples of the whole world's productions. We carry on not only an inter-town and inter-State, but an international commerce. Our name is legion. In the State associations represented in this convention, our membership aggregates tens of thousands, and through these same State associations we are carrying an insurance upon each other's lives, amounting to over \$50,000,000—one association of our number having already collected and distributed \$500,000 among the families of its deceased members. Our sales during the year reach far into the hundreds of millions of dollars, and to do this we travel millions of miles, and are followed by millions of tons of freight, as the results of our efforts. Can we not truthfully claim that we are the auxiliaries of commerce, and her faithful laborers?

We are here to make the first concerted effort toward trying to obtain some concessions of tariff on sample trunks and rates of railroad fare from the different lines we are constantly patronizing. That we are entitled to some reduction in rates no fair-minded man can deny. We have, through the State associations, obtained recognition of our just claims from some of the railroad and steamboat corporations, but we have not as yet made such effort as we are now determined on in pursuit of that which is justice in our due. The ways, the means and the methods, by which we shall try to accomplish our object, will come before you for discussion to-day. During the last six months we have corresponded with many representative men of our different organizations, and have found a great unanimity of feeling existing. We therefore wish to make the following recommendations for

your consideration: 1. Experience has taught us that we are wasting time and effort in approaching the different railroad corporations singly and alone, for while we have been treated politely and courteously, and have in some instances obtained the concessions which we have asked for, yet, as a general thing, we have been referred to the general ticket and passenger agents, with the information that this matter came more directly in their line and must be arranged by them. We therefore recommend the appointment of a strong committee, to draw up in plain form, without argument or verbiage, a document specifying just what we ask for and think should be granted.

2. That this committee be instructed by the convention to present such document to the General Ticket and Passenger Agents of the United States, when assembled in convention, being prepared to explain and defend the same, and endeavor by all honorable means to secure the concessions asked for.

3. We recommend that the amount of baggage on which free transportation is asked for be left to the discretion of the committee, and that the rates of railroad fare, &c., be arranged on a scale of percentage, reduced from the regular through fare of the respective lines.

4. That the matter of reduced hotel rates to members of the National Association (for the present at least) be laid upon the table.

In submitting these recommendations for your consideration we are aware of having opened a broad field for discussion, yet we hope to be perfectly harmonious in our deliberations, and also hope that we shall succeed in securing tangible benefits for ourselves, for our successors and for the associations we represent.

If we do this we feel that the National Association of Commercial Travelers of the United States has not labored in vain, but has accomplished the object for which it was organized.

Bullion in the New York Assay Office.

It costs \$1200 to send \$5,000,000 in bullion from the New York Assay Office to the Philadelphia Mint. That is why a room in the Assay Office is at present walled around with gold bricks. The weight of \$5,000,000 is 84 tons, or, more accurately, 16,585 pounds. Congress was asked for \$50,000 to cover the expense of transporting bullion to the mint, but it only appropriated \$20,000. Between the 2d of August last and May 1, \$90,000,000 in gold was received in the Assay Office, and, for lack of money to send it to the mint, \$60,000,000 yet remains on the hands of Superintendent Thomas C. Acton. This \$60,000,000 weighs about 99 tons. A man who should own it would be able to wall himself up in it as in a well, and the well would not be so wide or so high but that he could stand in the middle and touch every brick. The number of gentlemen in this country who could perform this interesting experiment with their own gold is small. The bricks in the Assay Office average about \$400 apiece in value. The most of them are not much to look at. They are as black and dull in color as a cheap quality of stovepipe. If you scratch one with a knife, you make a bright yellow mark, and this mark will not get black again. These black bricks are composed of melted foreign coins, containing about the right amount of alloy for American coinage, and so the alloy is allowed to remain in them. When the melted gold is poured into the molds, the oxygen of the air attacks the copper of the alloy and turns it black. If it were worth while to protect the bricks from the air until they got cold, they would never get any darker in color than a gold coin would. Two-thirds of all these bricks are made of French 20 franc pieces. Those bricks made of gold directly from the mines are very nearly pure metal, and are as bright as coins. The drainage from all this gold, if it were put at interest at 5 per cent., would make a golden stream of \$342 an hour running day and night.

"I know just as well how much gold there is in this room," Superintendent Acton said, as he gazed about at the piled-up wealth. "As I know my own age, but notwithstanding that it must all be weighed again in anticipation of the account to be rendered by July 1. If we had had money enough to send it to the Philadelphia Mint, we would not have the great trouble of weighing it. About \$100,000 of it only is put on the scales at a time."

Six men were at work. Down the faces of all but two of them the sweat rolled, and their hands were grimy with black oxide of copper. They tugged at the gold bars like longshoremen unloading pig iron. A heavy platform truck, on four small wheels, was rolled into the room, and on this about 25 bars, or bricks, taken from the built-up golden walls on three sides of the room, were laid. The truck was then drawn along the floor by four men, two pulling and two pushing, into an adjoining room, where the scales were. The scales are about 5 feet high, and the index needle is more than 4 feet long. The beam and the pans are suspended on steel edges as sharp as knife blades, to avoid friction. When the small weights had been added to the large ones to balance the gold, the point of the long index needle would tremble over the middle line of the ivory graduated scale. This pair of scales is of a kind so delicate that when brought to a balance with two pieces of paper of equal size in the pans, the mere writing of a name with a lead pencil on one of the pieces of paper will add enough weight to the paper to turn the scales in its favor. This has actually been done on one of the scales in the assay room, but that pair is protected from air currents by a glass case.

The men who handle the gold, though not differing much in outward appearance to the casual observer from coal heavers, are, in fact, men of intelligence, of approved reputation, and who have received good pay.

"We would not have all this trouble," said the chief weigher, as he put a 500-ounce weight gently on the scales with his right hand and wiped off his brow with his left, "if we had arrived at the 'parliament of man, the federation of the world.' What we sigh for here is an international system

of coinage. The most of all this weight came to this country as good foreign coin, but its lack of uniformity with our mintage compels the United States to recoin it, and me to fight these weights all day."

A larger supply of foreign coins than usual has come into the country since August last, because the rate of exchange has been in our favor. It was explained that the most of the gold other than foreign coin came to the Assay Office by express from mines and from various business houses. It sometimes happened that a deposit of original dust, in small, flaky grains, was brought into the office by a bronze-faced miner in person, who had brought it East with him on a visit to his former home.

The method is to take the gold on deposit from the bankers or others who send it, and to give them a check on the Sub-Treasury after an assay had been made. Each deposit of gold is melted and cast into bricks in every case before the assay is made. Two small quantities are then chipped off from two different bricks and sent one to each of two men in the assay room. Here 7½ grains of each quantity are carefully weighed out by each man on a separate pair of scales inclosed in a glass case. This 7½ grains corresponds with a French weight which has been divided into a thousand equal parts. Each of the two assayers works separately, but in a similar manner, to the end of the assay. Their results must agree to within a very small fraction. Each adds to the weighed gold a definite quantity of silver. The weighed particles of gold and silver are then wrapped up in a little sheet of pure lead of a known weight that is first twisted into the shape of a cornucopia to receive them. This pellet of gold and silver and lead is then melted in a cupel, a little porous white cup made of bone ash. A draft of hot air passes over the melted mass, and this oxidizes the lead, and the presence of the oxidized lead aids the oxidation of the copper mixed in the gold, and carries it down with it into the pores of the cupel. There is left a little button of gold and silver lying in the bottom of the cupel. This is hammered, to knock off the scales of oxide that cling to it, and then rolled into a ribbon nearly half an inch wide. This ribbon is coiled up and put into a little platinum cup, the size of a thimble, and set into boiling nitric acid. The bottom of the platinum cup is perforated so that the boiling acid may enter and get a fair chance at the silver. It will not attack either the gold in the ribbon nor the platinum of the cup. The coil is boiled for minutes, and then lifted out and boiled 10 minutes more in fresh acid. By this time the silver is all eaten out of the ribbon, and the gold is left porous, which makes it so brittle that if it is pinched the little coil will crackle into pieces in the fingers. It is accordingly subjected to just enough heat to cause the particles to adhere. This little coil is now pure gold. It is unpolished, and of a dull creamy color. Not a particle of the gold has been lost, but all of the other metals in the alloy have been removed. It is again carefully weighed. Suppose that whereas it originally weighed 1000 according to the system of weighing explained above, it now weighs only 873. This shows that the metal brought in to be assayed contains 873 parts in 1000 of gold, or, in other words, 87.3 per cent. of it only is pure.

All gold is melted before it is assayed, and having been assayed it must be melted again in order to be refined. An additional quantity of silver is added to it for the same reason that has been explained in the process of assaying. It is then melted and granulated by flinging the molten gold from a ladle upon the surface of water. The idea is to make the gold fall in a sheet on the surface so that it will break up into little flaky masses. This granulated gold is then dried, and for convenience of handling is pressed into cheese-shaped masses. These are cut up and the pieces are put into boiling oil of vitriol. The acid dissolves the silver and copper, which turns it blue. This blue liquid is drawn off with a siphon. The boiling is repeated several times, varying in number according to the purity required, after which the gold is melted and run into brick-shaped masses to be carried to the treasure room.

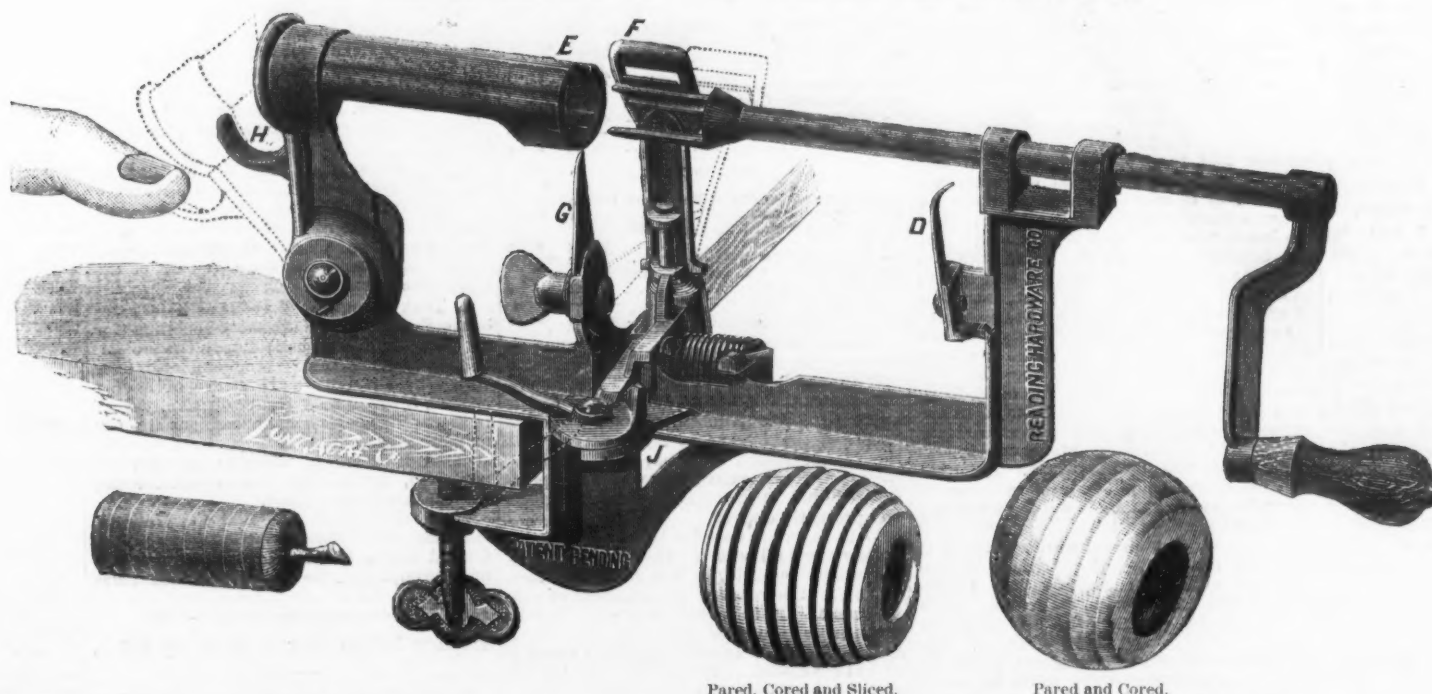
At a recent meeting of the Society of Architects and Engineers at Aix-la-Chapelle, Mr. Meydenbaur, Inspector of Buildings at Marburg, read a paper on architectural measurements by means of photography, and explained a new method of making such measurements which is of the greatest interest. Last year during a "Studienreise" of the professors and students of the Aix-la-Chapelle High School of Technology, sketches and measurements of a number of buildings in Colmar were made, and at the same time photographs of the same structure were taken with Mr. Meydenbaur's apparatus. The geometrical work of the measurements was accomplished in a few minutes by means of photography, agreed in every particular with the work of the professors and students, which, of course, occupied a far greater time and was accomplished only through much more exertion and trouble. The Meydenbaur system is called "photogrammetry"—a poor word, which was probably used because "photometry" and "photography" were unavailable, having a distinct application of their own—and in illustrating it its author exhibited some specimens of its workings, among which were the ground plan and views of a mosque in Shiraz which was built in the ninth century, and which has no name in the history of art. The photographs of these were taken with the Meydenbaur apparatus by Dr. Stolze, a member of the expedition which observed the last transit of Venus in Persia, and the measurements were afterward made in a few hours by Mr. Meydenbaur at home. Otherwise nothing could now be known of this mosque, since the fanaticism of the people of Shiraz would have permitted of no long desecration of their holy place. The value of the photogrammetric process is vouched for by Prof. Ewerbeck and Henrici, of the School of Technology, who say also that its application is astonishingly easy. Its value in archaeology is indisputable, for it will do away with much of the costliness of investigating the architecture of lands whose culture is forgotten.

APPLE PARER, CORER AND SLICER.

THE VICTOR OF 1881.

PATENT PENDING.

The Most Complete Machine of the kind yet invented.



Will either Pare, Core and Slice; Pare and Core, or Core only.

FOR PARING, CORING AND SLICING.—Place the apple on the fork; by one turn of the crank the small Knife D removes the paring from the base; continue turning, and move the apple toward the mouth of the Tube E; the Paring Knife F and Slicing Knife G will perform their functions; the apple will be drawn on the Tube E by the internal screw which removes the core. To remove the apple, raise the end of the Tube E by pressing on the Hook H at the opposite end.

FOR PARING AND CORING.—Drop the Slicing Knife G by loosening thumb screw; proceed as before.

FOR CORING ONLY.—Drop the Slicing Knife G, throw back the Paring Knife F by aid of the Cam J; proceed as before.

The shaft is so arranged that the fork will not come in contact with the paring knife (a serious defect in other machines of this kind), and by merely throwing the paring knife backward the largest apple can be placed on the fork without difficulty. In its adjustment to the table the arrangement is such that the parings and cores will drop into a receptacle placed beneath, thus leaving the pared fruit entirely clean and free from offal. Every machine warranted as represented.

Prices as low as any other first-class machine. Address your orders to

READING HARDWARE COMPANY, Reading, Pa., U. S. A.

COVERT MFG. CO.,

SOLE MANUFACTURERS OF



TRADE MARK.

COVERT'S PATENT HARNESS SNAPS,

Chain and Rope Goods.

These goods are sold by all leading jobbers in General and Saddlery Hardware at manufacturers' prices.

Send for illustrated catalogue and price list.

COVERT MANUFACTURING COMPANY,
WEST TROY, N. Y.

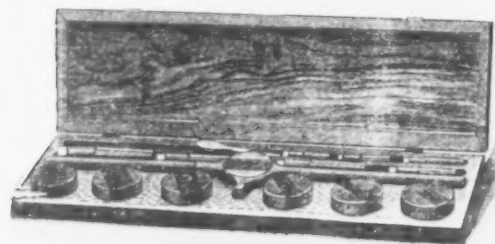
STEPHENS' PAT. VISE.
Stationary and Swivel Bottoms.
The Best in the Market.
For Sale by the Trade.



STEPHENS PAT. VISE CO.
41 Day Street, New York.

LITTLE GIANT SCREW PLATES

MADE BY
WELLS BROS. & CO.,
Greenfield, Mass.,
Manufacturers of Taps, Dies, Taper Reamers, Bolt Cutters (hand or power), Samsou Tire Shrinker, Tire Bender, Foot Vise and other Blacksmiths' and Carriage Makers' Improved Tools.
Send for prices and Illustrated Catalogue.



COAL, TIME AND LABOR SAVED! BY USING MORGAN'S Variable Blast Tuyere Iron

This cut represents the interior of the Tuyere, showing the rotating air tubes through which four different sized currents of air may be passed, thereby making any sized fire from two to 15 inches in diameter; for instance, if a large fire is being used and the next job should be a nail rod, we do not move or burn the large bed of coal,



but turn the small tube up and so concentrate the heat to the point desired. The constant flow of water keeps the Tuyere cool and prevents cinders or clinkers from forming in the fire. To prevent the water from freezing in the pipes, the barrel is supplied with a faucet that empties the pipes but not the barrel. All the dirt from the fire sifts through the perforated fire cap into the dirt box, from which it is blown by the blast when the ball valve is raised for that purpose. I also furnish Tuyere Irons without water attachment. See first issue of the month.

After having used your "Variable Blast Tuyere Iron" three months, I pronounce it perfect in every respect, and it actually saves from 25 to 50 per cent. of the coal. CHAS. VAN HORN, Earlville, Ill.

Send for price list and discount.
A. W. MORGAN, Patentee and Manufacturer,
Office, 52 Vance Block, Indianapolis.



John Waldron,
Manufacturer of
Sprout's Double and Single Shear
Horse Hay Forks
And
Sprout's
HAY ELEVATORS,
PULLEYS and GRAPPLES.
Send for Circulars.
Muncy, Lycoming Co., Pa.

STOVE REPAIRS.

Repairs for Stoves made at Troy, Albany, Rochester, Cleveland, Buffalo, Boston, St. Louis, Quincy, Chicago, Milwaukee and elsewhere, at
W. C. METZNER,
127 W. Randolph St., Chicago, Ill.

PHOENIX CASTER CO.,

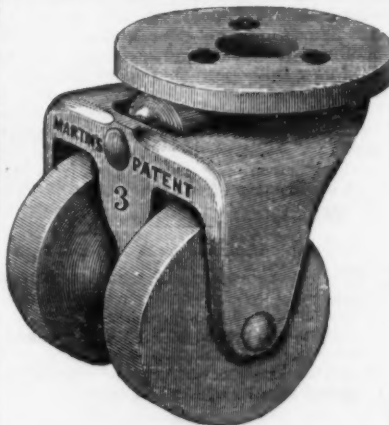
Indianapolis, Ind.

George A. Ruhleman & Co., St. Louis, Mo., have sold our Casters as follows:

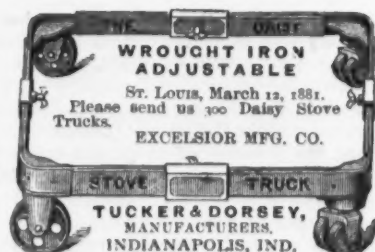
1878.....	Amount, \$14.55
1879.....	246.76
1880.....	710.53

Our Caster is no experiment. The people will have it, if it does cost more than the shams on the market. Eight-inch Mill Files are no better stock. Introduce yourself to these goods by a very small stock order of our selection. Terms, 60 days. Ship them back if they fail in your esteem. Send for catalogue.

PHOENIX CASTER CO.,
Manufacturers,
INDIANAPOLIS, IND.



Our Drawer is so uniform, simple, and strong that it has driven all competitors from the field.



J. STEVENS & CO.,

Chicopee Falls, Mass., P. O. Box 224,

Manufacturers of

SPRING CALIPERS AND DIVIDERS

Also, Surface Gauges and Counter Sinks, Stevens' Patent Breech-Loading Sporting Rifles, double and single barrel; Shot Guns, Pocket Rifles, Pocket Pistols, and the noted Hunters' Pet Rifles. Our

SHOOTING GALLERY RIFLE

Is the favorite everywhere.

REMOVAL.

Please notice that we have removed from No. 295 THIRD AVENUE to
No. 37 Warren Street, near Church St.,
Where we hope to be favored with a continuance of your generous patronage.

J. M. FARRINGTON & CO.,

Successors to DAY, FARRINGTON & CO., Manufacturers of

LOCKS, KNOBS, GONGS, BLANK KEYS,
Wrought Store Door and Flush Bolts, Silver Plated, Ornamental Bronze and other Hardware.

Gentlemen.—This cut illustrates our

CAST IRON Furnace Lamps

which are superceding entirely the Tin Lamps wherever introduced, in consequence of their durability. They are now extensively used in the Iron Districts of Ohio and some in Pennsylvania. We call your attention to and solicit your order for them, confidently asserting that they are an A No. 1 article in every respect.



Sample sent if desired.
PRICE, \$12 PER DOZEN.


Taylor & Boggis,
CLEVELAND, O.

Successors to **PENFIELD BLOCK CO., Lockport, N. Y., U. S. A.**

Manufacturers of a Full Line of
Store, Warehouse, Platform,
Railroad and Express

TRUCKS.

PULLEY BLOCKS, SHEAVES,
Faucets, Mallets & Car Pushers.

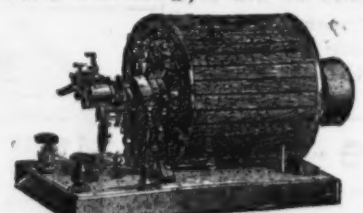


HENRY B. NEWHALL,
105 Chambers Street,
NEW YORK AGENT.
S. H. & E. Y. MOORE,
163 & 165 Lake Street,
CHICAGO AGENTS.

The American Dynamo-Electric Machine,

For Electro-Plating, Electrotyping, &c.

Requires no Water. Latest
Combining Improvements.
all the Cannot Reverse
Current.



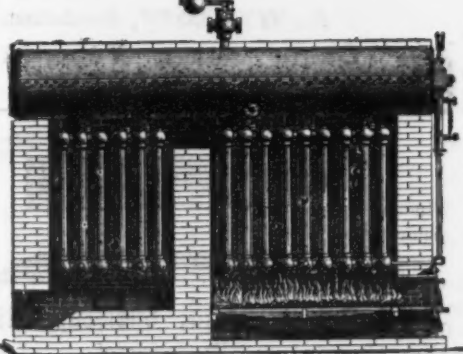
ZUCKER & LEVETT, Genl. Agents,
Manufacturers and Importers of NICKEL PLATERS' SUPPLIES.
540, 542 & 544 WEST 16TH STREET, N. Y.

DUPLEX SAFETY BOILER.

Unequalled Economy.

Positive circulation, insuring under all circumstances a clean boiler. No sediment. The best materials. No joints, but expanded joints in combustion chamber.

The most durable boiler made. Send for circular.



DUPLEX SAFETY BOILER CO.,
34 Cortlandt Street,
NEW YORK.
Chicago Office,
45 Franklin Street.

PROPRIETORS OF

NORTH CAROLINA HANDLE CO.,




MANUFACTURERS OF

Handles and Spokes,

79 Reade Street and 97 Chambers Street,
HARDWARE COMMISSION MERCHANTS. NEW YORK.

FACTORIES,
New Britain, Conn.

WAREHOUSES,
29 Chambers St.,
New York.

Stanley Rule & Level Co.,

Improved
Carpenters' Tools.



Manufacturers of Bailey's Patent Adjustable Planes.
General Agents for the sale of Leonard Bailey & Co.'s "Victor Planes."
Manufacturers of "Defiance" Patent Adjustable Planes.

The Iron-Masters' LABORATORY.

Exclusively for the
Analysis of Ores of Iron, Pig and Manufactured Iron, Steels, Limestone, Clays, Slags and Coal for Practical Metallurgical Purposes.

No. 339 Walnut St., Philadelphia.
With Branch at Warrenton, Virginia,
J. BLODGET BRITTON.

This laboratory was established in 1866, at the instance of a number of practical Iron Masters, expressly to afford prompt and reliable information upon the chemical composition of the substances above mentioned, for smelting and refining purposes. The object being to make it at once a convenient, practically useful, and comparatively inexpensive adjunct to the Furnace, Forge and Rolling Mill.

CHARGES TO IRON WORKS.
For determining the per cent. of Pure Iron in an ordinary Ore..... \$4.00
For the per cent. of Pure Iron, Sulphur and Phosphorus in do..... 12.50
For each additional constituent of usual occurrence..... 1.50
For those of unusual occurrence or difficult to determine, the charge must necessarily depend upon circumstances.
For determining the per cent. of Sulphur or Phosphorus in Iron or Steel..... 7.00
For each additional constituent of usual occurrence..... 6.00
For the per cent. of Carbonate of Lime, and Insoluble Silicious Matter in a Limestone..... 10.00
or each additional constituent..... 2.00
or the per cent. of Water, Volatile Combustible Matter, fixed Carbon, and Ash in Coal..... 12.50
For determining the constituents of a Clay, Slag, Coke, or of an Ash in Coal the charges will correspond with those for the constituents of an ore.
For a written opinion or letter of instruction the charge must necessarily depend upon circumstances.

Printed instructions for obtaining proper average samples for analysis furnished upon application

BAY STATE PUMP CO.,
Manufacturers of the
TORRENT ROTARY PUMP
FOR MANUFACTURING PURPOSES.
FIRE PUMPS A SPECIALTY.
Send for catalogue and prices.
21 Charlestown St., BOSTON, MASS.

MINERS' CANDLES.
Superior to any other Light for Mining
Purposes. Manufactured by
JAMES BOYD'S SON,
Nos. 10 & 12 Franklin St., New York.

Grindstones, Emery, &c.
Walter R. Wood, GRINDSTONES.
Berea, O., Nova Scotia, & other brands
283 and 285 Front Street, New York.

GEO. CHASE,
The largest manufacturers in the world of
OIL STONE
Of all description.
107th Street and Harlem River,
Send for Illustrated Price List. NEW YORK.

OHIO GRINDSTONES.
Superior Ohio Grindstones, manufactured by
P. L. Cole, Constitution, Ohio, will be supplied to the Southern trade at lowest possible rates by
S. B. LOWE, Southern Agent,
Chattanooga, Tenn.



McDERMOTT & BERA STONE CO.,
Manufacturers of
GRINDSTONES,
Cleveland, Ohio.

OHIO GRINDSTONE COMPANY,
Manufacturers of
GRINDSTONES
Of All Kinds.
127 Superior Street,
CLEVELAND, OHIO.

NEWCASTLE GRINDSTONES (ENGLAND).
Celebrated for their uniform quality and keen rasping grit, have now a world-wide reputation.
For prices apply to
R. ATKINSON & CO.,
Manufacturers,
Office, Guildhall, Newcastle-on-Tyne.

EMERY.
Large stock on hand, especially suited to Saw and Shovel Manufacturers, at bottom prices.
Importers and Manufacturers of
PURE TURKISH EMERY.
IRVINE, TOWNSEND & CO.,
193 Chambers St., New York.
Send for quotations and samples.

INDUSTRIAL ITEMS.

MASSACHUSETTS.

The Washburn Iron Company's works, at Washington Square, Worcester, were shut down last Saturday for repairs. An entirely new set of machinery will be put in, and the works are expected to be ready to start about October 1 for the manufacture of steel rails. Heretofore the company have made iron rails.

The Lowell Machine Shop, Lowell, has received orders during the past week for Foss and Pevey Cards from the Hutchinson Manufacturing Company, Bowensville, Ga.; Loes Manufacturing Company, Westport, Conn.; and Hadley Thread Company, of Holyoke.

N. R. Davis & Co.'s gun factory, at Assonet, employing about 30 hands, has started up on full time after a week's vacation. From 500 to 800 guns are turned out monthly.

The Brainerd Milling Machine Company, of Hyde Park, have purchased from the Hall estate a large tract of land adjoining the mills. To the main mill an addition of 50 feet has been built for the erection of machinery and to accommodate a blacksmith shop.

The Cape Ann Forge Works, of Gloucester, have added a 6000-pound hammer to their works and have also made other additions to their facilities, and are now enabled to turn out a heavier class of forgings than formerly.

There are many building projects being agitated in Chicopee Falls at present, among which are an iron foundry by the Belcher Bros. and a shop for the Whitcomb lawnmower.

The Deane Steam Pump Company, of Holyoke, has recently opened warehouses in Chicago.

J. C. Smith has leased the building now occupied by the Postal Card Works, Holyoke, and is to remove his Bigelow street machine shop there as soon as the building is vacated.

The Springfield armory is now running in all the departments with about 30 men less than were employed last year, or 250 in all.

Anthony & Cushman, tack manufacturers, Taunton, have purchased the buildings of the screw works, off Court street, and will immediately remove their machines and appliances for the manufacture of tacks and shoe nails. They are also going to add a large number of new machines to enable them to fill their orders.

CONNECTICUT.

The Pratt & Whitney Company, Hartford, have added 100 hands during the past six months, making their force now upward of 700 workmen. There are orders for 200 engine lathes of 13 inches swing, and of beds of 4, 5 and 6 feet; 60 16 inch swing lathes to be delivered September 1, and 2 14-inch shapers, nearly ready, for the Kansas & Topeka Railroad. The new department has, on one floor, 13 planers of 40 and 48 inches opening between uprights, and 20 feet bed. Several large horizontal boring mills are being made in the works, of 15 inches range, 42 inches swing and 14 feet bed, 2 of them for the home factory. Rock cutters, milling machines, screw machines, upright drills and cutting-off lathes are also being manufactured for various parties.

The Needle Company, at Torrington, is adding another story to its factory, and is also making stairways on the outside.

The Hartford Engineering Co., Hartford, have now 180 men on their pay-roll. In the Medart pulley department they are turning out from 25 to 30 pulleys per day, and within two weeks will put in additional machinery and a 60-horse-power engine, which, with increased number of hands, will give a capacity of not less than 100 finished pulleys per day. In the engine department there are orders for 51 engines, averaging 150 horse-power each. Among these orders are one for double engines, 500 horse-power, for the York Manufacturing Co., Saco, Me.; two 150 horse-power for the Globe Yarn Mills, Fall River, Mass.; one 75 horse-power for the Union Wadding Co., Pawtucket, R. I.; one 400 horse-power for Peter Adams, Buckland; one 150 horse-power for the Hartford Manila Co., Burnside; a pair of 300 horse-power for the United States Electric Light Co., and several other minor orders.

The Cutlery Company, at Southington, have commenced work.

John Bayliss, manufacturer of the well-known hot-blast tuyere, water tuyere and Little Giant portable forge and bellows, has removed his works from New York City, where he has been in business for over 30 years, to Stamford. This change of base was made in order to increase his facilities for a more extensive manufacture of his tuyeres and forges. He has appointed Brower & Leeds, 81 Murray street, New York, his sole agents, who carry a full stock of his goods.

The Ansonia Brass and Copper Company, Ansonia, will add large buildings to their extensive works, in which to manufacture brass by a new process, consisting of the use of gas in the refining of metals instead of coal, thereby enabling an increase of the product and a better distribution of heat about the metal, at the same time providing for more cleanliness in the manufacture. One of the new buildings will be 226 feet in length by 40 in width, and the other 180 in length and 80 in width, and a great stack will be erected with a 6-foot flue connecting with the gas building, passing underground a considerable distance. The buildings will be of brick with iron roofs, and 1,000,000 brick will be used in the work.

NEW JERSEY.

The Trenton Lock and Hardware Company, of Trenton, stopped work for repairs at their extensive establishment on July 1, and started up on Monday, the 15th. They are bringing out a large line of new goods, and will issue a supplement to their catalogue early in September.

PENNSYLVANIA.

The Newton Machine Tool Works, Philadelphia, have brought out a new gear cutting engine, for cutting spur or bevel gears on wheels from 30 to 60 inches diameter.

The stoppage at the Bechtelsville Furnace is likely to continue several days, and fears are entertained that the furnace will chill before the repairs can be made.

The Monocacy Furnace Company, Berks County, has leased Trimble's iron mine, in

West Whiteland township, Chester County, and is now working it.

It would seem probable that there is an intention to start the Wheatland mill. Workmen have been busy getting the boilers ready for raising steam, and began filling the huge water tank on Tuesday. The force of workmen is not very large at present, but still it looks like a beginning.

The proprietors of the Thorndale Iron Works, Chester county, have stopped work for a while, intending to enlarge their mill and put in new furnaces.

It was thought by many that the large stove foundry of Shantz & Keeley, at Spring City, which was recently destroyed by fire, would not be rebuilt at that place, but it is now stated that Mr. Keeley, the proprietor, has determined to rebuild it, and that work upon it will be commenced immediately. Nearly all of the workmen formerly employed in the works have offered to give one, and others two weeks' work in cleaning away the rubbish of the old building.

Sotter Brothers, of the Mechanics' Boiler Works, Pottstown, received five new orders for large boilers from New York again today. They also received an order from the Philadelphia Bridge Works, of Pottstown (Coffrode & Saylor), for a stack 55 feet high and 42 inches in diameter.

The Parker Glass Works, at Kittanning, will not shut down during the present month and August, if men can be had to keep them running.

Columbia Furnace, at Danville, owned by Grove Bros., averaged about 21 tons of pig metal a day during last month.

The Reading Railroad Rolling Mill, North Reading, which stopped last Saturday a week ago, went into operation again last night. During the stoppage a number of repairs were made. The cylinder of the rail engine was rebored by a Philadelphia firm, and supplied with a new head; the squeezer and several furnaces were rebuilt, and some new shafting was placed in the mill. All the machinery was thoroughly inspected before the mill was put into operation again. The employees number about 280.

The Wheeler Iron Company's rolling mill resumed operations in the puddling department last week. We understand it is expected that the mill in all its departments will be in full operation in a few days.

The repairs to the rolling mill and nail factory of the E. & G. Brooke Iron Company, of Birdsboro', which were commenced last week, are steadily progressing. The old foundation in the factory is almost removed, the foundation for a nail plate furnace completed, and other work, necessary before the new machinery can be put in place, is being pushed vigorously forward. It is expected that the puddling department of the works will be ready for operation by Monday next.

Business is active in coke at Latrobe. All the works are in full blast, and each of them building additional ovens to increase their supply. One works will have 100 new ovens in blast in the course of a few weeks.

We learn that Mr. W. W. Scranton, lately of the Lackawanna Iron and Coal Company, is about to erect a new steel mill near Scranton. He has been for some time in England and Germany perfecting his plans, and as soon as he obtains his charter will commence building operations. The establishment will be called the Scranton Steel Works.

The new stove works of Stauffer, McKnight & Co., Reading, are rapidly approaching completion, and will soon be ready to be put in operation. The buildings are under roof, and they are being finished in the interior.

The old Warwick mines at St. Mary's are about being reopened by the E. & G. Brooke Iron Company, of Birdsboro', who are getting a great deal of iron ore at present from over this branch railroad, and from the Jones' mines. Smith & Buckley will also resume operations at their mines near St. Mary's.

The Danville Iron and Steel Works produced during the month of June 3399 tons of rails.

The L. B. Flanders Machine Works, Philadelphia, have had all sizes of their portable cylinder boring machines in almost constant use for weeks past. Recently they have bored out cylinders for J. & J. Wister, of Harrisburg; Wm. Neal & Sons, of Bloomsburg; Philadelphia and Reading Coal and Iron Company, at Reading; J. B. Morehead & Sons, of Conshohocken; Pencoyd Iron Works; the steamship Vaderland, of the American Line; and the Corliss valves of the Lochiel Iron Works, at Harrisburg.

S. J. Cresswell, of Philadelphia, is busy on cast-iron work for Cuba, Central America and Texas. Mr. Cresswell, besides other work, has recently received orders for 100 large pillars for the extensive establishment of Sharpless & Sons, of Philadelphia.

PITTSBURGH AND VICINITY.

The Phoenix Roll Works of Young & Co., Lawrenceville, are running night and day on orders.

It is reported that a large rolling mill is to be built in Allegheny City. Some time since it was announced that the Pittsburgh and Western Railroad had bought the extensive saw mill property at the eastern end of the Exposition grounds, and intended building large freight depots, &c. This new rolling mill will be built on some property adjoining that of the Pittsburgh and Western, and the railroad will be used to convey the iron ore, coal, &c., directly to the mill, and to carry the manufactured goods to the market. The plan for the new mill is said to be a fixed fact. All the gentlemen interested are prominent in iron circles, and are fully able to carry out such an undertaking.

Wm. McCully & Co. are rebuilding their glass works at the corner of Twenty-sixth street and railroad, which was destroyed by fire last winter.

Brown's mill, corner of Tenth street, is idle in all departments for repairs. Some of the old furnace stacks are being taken down and new ones erected.

Atterbury & Co., glass manufacturers, are running full time as usual, and will keep on all through the season. Business is reported very fair.

Wilson, Walker & Co. are putting in a 1500-pound steam hammer and a 50-ton track scale.

Within the past week a new industry has

SPRING HINGES.—SCOVILL MANUFACTURING CO.

WROUGHT IRON WITH BRASS SPRINGS.

Packed with Screws.



SINGLE JOINT.

	Per doz. Pairs.
2½ inch, No. 301.....	\$3.60
3 " No. 303.....	4.40
4 " No. 305.....	6.75

DOUBLE JOINT.

	Per doz. Pairs.
2½ inch, No. 311.....	\$7.20
3 " No. 313.....	8.80
4 " No. 315.....	13.50

WROUGHT BRASS.

SINGLE JOINT.

	Per doz. Pairs.
2½ inch, No. 1.....	\$3.00
3 " No. 3.....	4.50
5 " No. 5.....	7.50

DOUBLE JOINT.

	Per doz. Pairs.
2½ inch, No. 7.....	\$6.60
3 " No. 9.....	8.30
5 " No. 11.....	16.50

SCOVILL MANUFACTURING CO.,

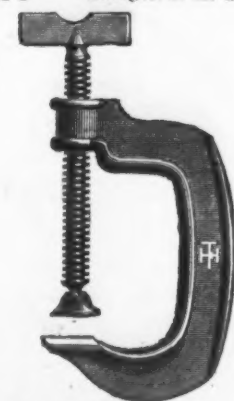
WATERBURY, CONN.

Depots: 419 & 421 Broome Street, New York.
177 Devonshire Street, Boston.
183 Lake Street, Chicago.

The above Spring is removed near the joint to SHOW the SLEEVE. This is the VITAL POINT in a Spring Hinge, and they are only to be found on Hinges of our manufacture. In all others the Spring will soon break from wear against the pin.

MALLEABLE IRON.

NEW pattern Heavy Screw Clamps; strongest in the market.



Hammer's Malleable Iron Oilers, 3 sizes.
Hammer's M. I. Hand Lamps.
Hammer's M. I. Hanging Lamps.
Hammer's Adjustable Clamps.

For sale by all the principal Hardware Dealers. Send for Price List.

MALLEABLE IRON CASTINGS
Of superior quality, and Hardware Specialties in Malleable Iron made to order.

HAMMER & CO.,
Branford, Conn.

EXCELSIOR LAWN MOWER



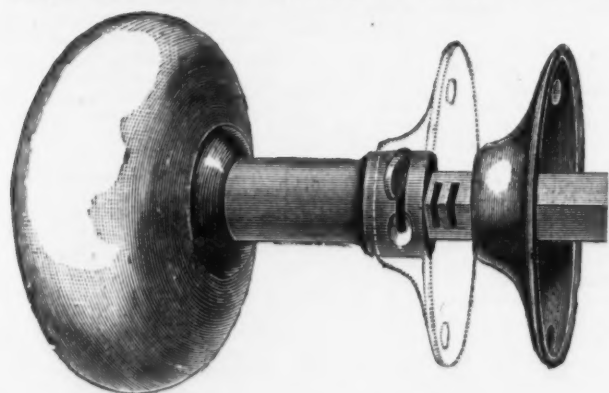
We make Seven Sizes of Roller Mowers and Six Sizes of Side-Wheel Mowers. We claim for our Mowers

Perfect Work, Light Draft and Simplicity.

We have received many first premiums in competitive trials with other Mowers, both in this country and a road. We have special patterns of Mowers for export, meeting the requirements of every market. Our new Horse Mower is conceded to be the Lightest and Best Horse Lawn Mower ever made. N. B.—Horse and Hand Lawn Mowers are alike guaranteed in all respects. Send for Illustrated Catalogue. Address

CHADBORN & COLDWELL MFG. CO.,
Newburgh, N. Y.

IMPROVED FASTENING FOR



DOOR KNOB SPINDLES.

Patented May 21, 1872.

The above cut represents an important improvement for securing the Door Knob neatly and securely on the spindle without the use of screws. Architects, mechanics and dealers pronounce this device superior to anything of its kind in the market. In fact, no first-class Door Knob is complete without it. No extra cost to dealer or consumer.

Manufactured only by

THE CLARK MFG. CO.

Buffalo, N. Y.

BAGNALL & LOUD,
BOSTON, MASS.,

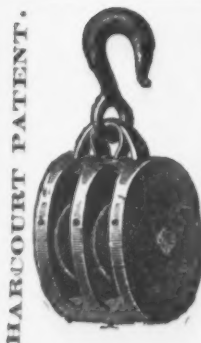
Sole Manufacturers in U. S. A. of our Celebrated

METALINE

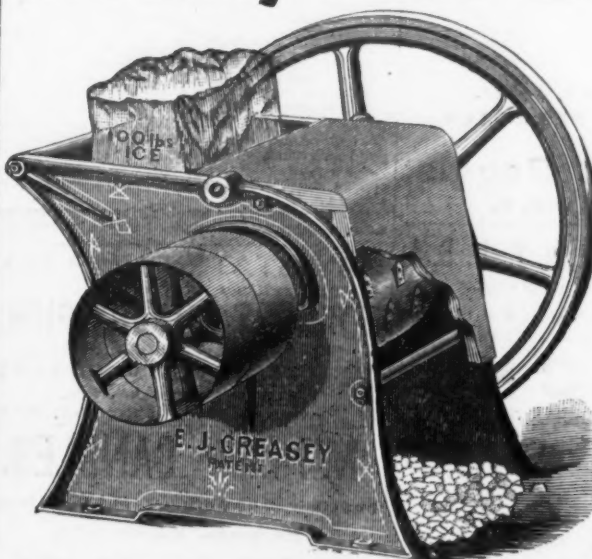
AND

Star Roller Bush
Tackle Blocks.

Send For Illustrated Catalogue.
New York Warehouse, 33 South St.



Creasey's Ice Breaker.



In Use by
MEAT & FISH
Packers,
ICE CREAM
Makers,
HOTELS
AND
CONFECTIONERS.
FIVE SIZES.

Saves Time, Money
and Labor.

Send for Circular to

JOS. S. L. WHARTON, 15th and Wood Sts., Phila.

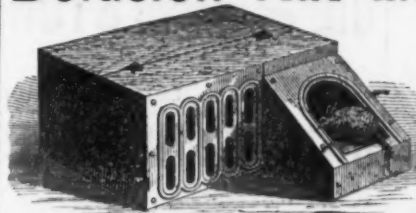
THE AMERICAN MACHINE CO.,

MANUFACTURERS OF

HARDWARE SPECIALTIES.

Office and Factory: Lehigh Ave. and American St., Philadelphia. Branch House: No. 128 Chambers St., New York.
SPECIALTIES: Fluting Machines, Hand Fluters, Plating Machines, Christmas Tree Holders, Bickford Portable Pump, Mrs. Potts' Patent Cold-Handle "Crown" Irons, Ice Cream Freezers and Cake Mixing Machines.

Delusion Rat and Mouse Trap,



Manufactured by
CLAUDIUS JONES & CO.,
ERIE, Penna.

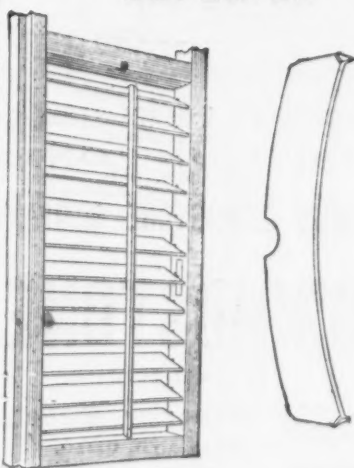
This is the only Self-setting Trap on the market, and the most successful. All orders direct to

CLAUDIUS JONES & CO.,
ERIE, Penna.

BENTLEY'S Perfect Blind Slat Holder.

Patented:

SUPERIOR TO ALL OTHERS.



For tightening the Slats of Window Blinds and holding them at any required angle.

The sunlight is let in or shut out at will.

The blinds are made a much better protection from cold, because when the slats are shut they are so kept by the Holder and cannot be moved by the action of the wind. Noisy rattling of the slats is prevented.

The holder is securely held by its spring and the sharp points at each end.

As it is made of brass it will not rust.

It cannot get out of order.

Its superiority over other holders is evident.

It requires no screws or nails to fasten it to the blind. Any one can apply it.

It cannot get loose or deface the blind as others do.

Retail Prices.

No. 1, For Outside Blinds, 5 cents each; 50 cents per dozen.
No. 2, For Inside Blinds, two for 5 cents; 25 cents per dozen.
At which prices samples will be mailed postpaid.

Trade Prices.

No. 1, \$6.00 per gross; discount 50 per cent.
No. 2, \$3.00 per gross; discount 50 per cent.

FOR SALE BY THE TRADE.

In case your jobbing house cannot supply you, orders will be promptly filled by

R. W. BENTLEY, Sole Manufacturer,
41 FOURTH ST., BROOKLYN, E. D., N. Y.

J. F. WOLLENSAK'S

PATENT

Transom
Lifter
and Lock.

For all kinds
of Transoms,
Fanlights and
Skylights.

Send for catalogue
and price list.

J. F. WOLLENSAK,

Patentee and Sole Manufacturer,

CHICAGO, ILL.



This Curb is shipped in the Knocked Down, and can be put together easily by any one. The advantage of shipping in the Knocked Down is that it can be shipped in a lower class of freight, reducing the cost of transportation at least two-thirds. It is a much handier and better made Curb than the old style.

A. WYCKOFF, Manufacturer,
Chain Pump, Tube, &c.,
ELMIRA, N. Y.



WM. L. DAVIS, Chelsea, Mass.,
Manufacturer of

WINDOW WEIGHTS,

Sole Manufacturer of

Park's Patent Folding Lunch Box.
CLOTHES WRINGERS.



T. J. ALEXANDER, Manager,
BOSTON, MASS.

REVISED
DISCOUNT SCREW LIST

NOW READY. Revised April, 27, 1881.

Complete list with 14 discounts. Price, 50 cts.

Published by
POPE & STEVENS,
114 Chambers Street, NEW YORK.
Sole Agents for Lamberson's Price Books.

"Climax" BARREL TANK ATTACHMENTS.



"Climax"

Is designed to be attached to any Barrel or Cask, thereby converting the same into a temporary Tank, fitted with an effective Pump, and while protecting contents from dirt and waste, the owner has entire control of same, by simply locking the cover. It entirely does away with the labor and waste attendant upon emptying Barrels into any of the numerous Metal Tanks, while securing all the conveniences of the same, at a greatly reduced cost. The Apparatus can be adjusted in a few moments to a Barrel of any size, and as quickly shifted to another when contents are exhausted, the process of connecting being very simple. It is so compact in form as to be consistent with perfect efficiency, and we feel confident that a trial will demonstrate its practical value.

WHO HAS USE FOR IT?

EVERY ONE

Who buys in bulk any of the various kinds of Oils, or in fact any Fluid that can be Pumped;

Every Mill, Factory, or Work-Shop, where Oils or other fluids are used, and every store where such fluids are retailed, will find the "CLIMAX" just what they require.

Send for Circular to

PANCOAST & MAULE,
Nos. 243 & 245 SO. THIRD STREET,
PHILADELPHIA, PA.



NOTICE TO THE TRADE.

There are six patents, domestic and foreign, on

Rubber Window Cleaners.

We own them all, and shall suppress infringements. The genuine cleaner is plainly stamped, "Manufactured by Perfection Window Cleaner Co., incorporated July 26, 1874." Has patent hollow handle with P. W. C. Co. cast in face. Our manufacturing facilities are so large that we undersell cheap and worthless imitations. We gladly mail sample cleaner with price lists to wholesale trade. Address,

Perfection Window Cleaner Co.,
167 Madison St., Chicago, Ill.

FOR SALE.—Machinery in Store.

Three 8 in. swing Drill Lathes, 4 ft. bed, hollow spindles.
Two 12 in. swing Hand Lathes, 4 1/2 ft. bed. Putnam Mach. Co.
One 8 x 12 Portable Engine and Boiler.
One 8 x 12 Portable Engine and Boiler.
Two 8 x 12 Stationary Engines.
One 8 1/2 x 12 Stationary Engine.
Three 9 x 12 Stationary Engines, link motion, suitable for hoisting purposes.
One Cooper Steam Pump, 8 in. steam, 4 in. water, 14 in. stroke.
Wood-working Machinery, Knowles' Steam Pumps, Fan and Cupola Blowers, Exhaust Fans, Centrifugal Pumps, Harrington's Screw Hoists, Emery Goods and manufacturers' supplies. The celebrated Phoenix Steam Engines, 15 to 50 horse-power. Second to none, and 50 per cent. cheaper than any others.

T. H. PRATT, 15 S. Water St., Cleveland, O.



THE BUCKEYE UPRIGHT HAND DRILL PRESS

Is giving the best of satisfaction in every instance. Specially adapted to the wants of Blacksmiths and Carriage makers. The trade are delighted with them. Price, \$12. Circulars and terms by addressing the makers,
FOLGER & CO.,
Springfield, O.

LEIGH'S DISCOUNT BOOK

Acknowledged by all the best work of the kind ever published. Price, by mail, One Dollar.
SPECIAL NOTICE.—This book will be cheerfully sent for examination or comparison to any responsible house requesting it, and return postage paid if book is not satisfactory.
Address,
E. B. LEIGH,
St. Louis Elevator, St. Louis, Mo.



THE GIANT PAD LOCK.

Manufactured by
THE SMITH & EGGE MFG. CO.
(Centennial Award.)

"Superior in Every Respect."
This is one of the best selling Locks in the market, and affords the dealer a large profit. It is thoroughly and strongly made—of the best material—very handsome in appearance, and every Lock is warranted. Orders solicited. Address as above
Lock Box 1708, Bridgeport, Conn.

THE "DAISY" LAWN MOWER.

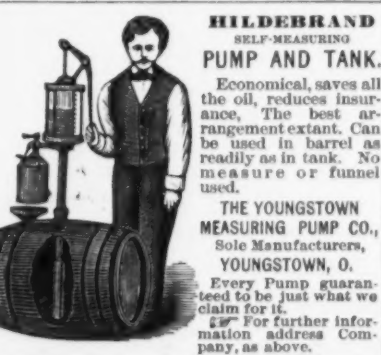


We are ready to supply the trade with the

Cheapest and Best Mower now in the Market.

Every machine unconditionally warranted. It has an adjustable vibrating handle, perfectly adapted for Terraces, Slopes and every variety of Lawn.
EVERYBODY CAN AFFORD TO BUY THE "DAISY."
Manufactured in four sizes, for hand use. Liberal discount to the trade.

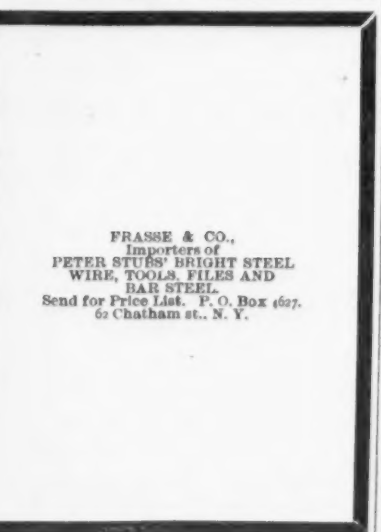
PAGE, FARGO & CO.,
325 Broadway New York.



HILDEBRAND SELF-MEASURING PUMP AND TANK.

Economical, saves all the oil, reduces insurance. The best arrangement extant. Can be used in barrel as readily as in tank. No measure or funnel used.

THE YOUNGSTOWN MEASURING PUMP CO.,
Sole Manufacturers,
YOUNGSTOWN, O.
Every Pump guaranteed to be just what we claim for it.
For further information address Company, as above.



THE DUPLEX INJECTOR.

The Best Boiler Feeder

Known.

Unequalled for simplicity and always reliable. Does not require adjustment for varying pressures of steam. Will start when the injector is hot. Less liable to get out of order than a pump. Always delivers water hot to the boiler.

Manufactured and for Sale by

JAMES JENKS,
16 & 18 Atwater St., East,
DETROIT, MICH.

FORGED OX SHOES.

The only Ox Shoe made with patent concavity to fit hoof. Also Flat Shoes with two calks complete, at same price. Worth double any Malleable Iron Shoe.

Greenfield Tool Co.,
Greenfield, Mass.

been established in Pittsburgh, regarding which the following is of interest: On the 4th of May last the Union Electric Signal Company, of Boston, Mass., removed from that place to Pittsburgh, occupying the large five-story brick building on Garrison alley, formerly occupied by the Bidwell Plow Works. On last Monday the Interlocking Switch and Signal Company, a leading industry at Harrisburg, shipped a large portion of their machinery, together with about 20 mechanics, to this city, and the two companies are now consolidated. The officers of the corporation are: George Westinghouse, Jr., president; Ralph Bagley, vice-president; and Mr. C. H. Jackson, of Harrisburg, general manager. Within the next two weeks all the machinery and appliances of the Harrisburg company will arrive, and the manufacture of railway appliances will begin on a large scale.

The Bradford Times hears it rumored that a number of coke ovens will be built and put into operation in the west end of the town, and also that a glass factory will be started here in a short time. Mr. Ihmsen, of this city, is said to be the gentleman who will make these additions to the town.

Bryce, Walker & Co., glass manufacturers, are running their new gas furnace, and it promises to give great satisfaction. They will continue on without intermission.

At the State Department, on the 11th inst., a charter was granted to the Pennsylvania Tubing Company, of this city, with a capital of \$800,000. The company, which has been incorporated for the purpose of manufacturing and selling pipe and tubing, is chartered for 50 years. The directors are: Joshua Rhodes, of Allegheny, 7890 shares; J. J. Vandergrift, 7890 shares; J. J. Buchanan, of Oil City, 10 shares; Michael George, of Oil City, 200 shares; Wm. H. Lashaw, of Allegheny, 10 shares. The first president of the company is to be Joshua Rhodes. This gentleman has hitherto owned and operated the Pennsylvania Tube Works, on Hen's Island. He, with the associates mentioned above, recently purchased the old Crescent Tube Works, and these two works have been consolidated under the above charter. The company intend to enlarge and improve their works.

Ripley & Co., glass manufacturers, started up on last Monday morning, and everything is going well. They will continue in operation right along.

OHIO.

The Queen City Malleable Iron Company is the name of a new company just commenced operations in Cincinnati. They have just completed new buildings and machinery, and have introduced some valuable improvements. In addition to their common malleable iron, which embraces all sizes and shapes known to the trade, they have added a specialty, "welding malleable castings," an article which, without the use of borax or other welding flux, can be welded to steel or wrought iron; or, two pieces of this iron may be welded together and drawn down under the hammer as fine as can be done with the best charcoal wrought iron, showing extraordinary softness and ductility. As will readily be seen by manufacturers of ornamental iron work, surgical and dental instruments, scissors, auger bits and all classes of edge tools, the forging of which enters so largely into the cost and limit of production, this class of castings is just what they want, as it saves a large investment in forging machinery and facilitates the work at reduced cost. The company are prepared to fill orders for their metal, and to make castings from patterns.

At Ironton, the Lawrence Iron Works Co.'s mill and that of the New York and Ohio Iron and Steel Co. are running.

The Brush Electric Company's Works, occupying six acres of ground on Mason street, Cleveland, at the crossing of the Cleveland and Pittsburgh Railroad, are the largest electric works in the world. The buildings first erected, and which consisted of a main machine shop 265 by 122 feet, with proportionate large boiler room, blacksmith shop, jannapanning oven, carbon factory, tool, carpenter and tin shops, have since had important additions. The machinery used is of the most perfect description. The engine driving it is of 400 horse-power. In the boiler room are three enormous boilers of Otis steel. They were built by the Variety Iron Works and the Cleveland Steam Boiler Works. The carbon department proves one of the most interesting to visitors. Here are furnaces in operation for the burning of the carbons. Provision is made for thirty-six furnaces, each of a capacity of 10,000 carbons, capable of turning out 75,000 carbons per day. The plant for the grinding, mixing, molding, pressing, plating and packing is on a corresponding scale. Three powerful hydraulic presses are in use. Such is the pressure of orders that a new machine shop 410 by 100 feet and an iron foundry 265 by 100 feet are to be added. Some of the material is now on the ground. The buildings are to be of brick and one story in height, thus securing the highest amount of solidity and entire freedom from vibration. With the completion of the buildings they will be capable of affording accommodation for 1500 men, and of turning out from \$8,000,000 to \$10,000,000 worth of work per annum. On a separate piece of land, facing the works, a laboratory has been erected in which Mr. Brush will pursue his investigations. Mr. George W. Stockley is the business manager of the company and Mr. N. S. Fossons the superintendent.—Cleveland Trade Review.

Dispatches from Youngstown are as follows: Brown, Bonnell & Co. are getting ready to build another rolling mill on ground recently purchased from Arms, Bell & Co. and Stambaugh & Arms. The mill will have 30 puddling furnaces, and when completed will give this mammoth corporation 125 puddling furnaces in their mills in this city.

Wellston Furnace will go into blast again in a few days.

The Boyer Elevator Company, Cleveland, have just finished a large hydraulic elevator with a capacity of 2200 pounds, for A. Teachout & Co. The company claim for it a superiority over all other elevators now in use, for simplicity, durability and economy. They are now constructing elevators for several large firms in Buffalo.

The Ohio Grindstone Company, of Cleve-

land, are now operating 13 large quarries of the celebrated Ohio sandstone with a force of about 700 men. The company have recently taken orders for upward of 2000 tons of grindstones, and the entire production of the company is already sold for many months ahead.

The casting house of Howard Furnace was consumed by fire on Friday night. The loss is not large.

The Corns Iron Company, Youngstown, are running their works full time, with trade very satisfactory. At present no new improvements are being added. The furnace for the manufacture of speigeleisen, which has been in process of construction near the Eagle Furnace has been started.

The Bolton Steel Company, Canton, are running their works night and day, with a force of about 175 hands.

Sarah Furnace will probably blow out this week, to put in a new hearth, the first since she started some years ago.

The Globe Iron Works, of Cleveland, are running their works night and day with a force of about 175 hands.

ILLINOIS.

The Paris Edge Tool Company, of Paris, Edgar County, is a new enterprise, incorporated last week with the following gentlemen as incorporators: C. V. Lodge, O. S. Jones and Henry Vansellar.

The company lately organized in Joliet for the manufacture of Walker's patent locomotive smoke-stacks have selected a site for the manufactory near the Solar stove works, and will build at once.

W. McGregor & Co., of Chicago, manufacturers of general machinery, recently furnished the Forest City Mining Company, of Ishpeming, Mich., with a quantity of machinery. They report business good.

The Northwestern Horse Nail Company are experimenting with a gas-heating furnace, for heating the nail rods for their forging machines; also experimenting with two new machines for making nails, capable of doing twice the work of their present machines, and which promises to be a success.

The Eagle Foundry, of Chicago, is the title of a new organization incorporated during the past week, with a capital of \$6000. N. H. Jones, L. B. Fuller and John J. Walsh are incorporators.

The National Boiler Works, of Chicago, will, on the first of September, erect a brick addition 60 x 120 feet to their establishment, and add thereto a quantity of new and improved machinery, consisting of punches, planers, shears, &c., and employ twice the number of hands in their works.

The old blast furnace erected at Joliet in 1872, but never used until the last year, has already proved too small for the business, and the steel company has had a large force of men employed during the month on a new one, which will have all the latest improvements and very much increase the capacity of the works. A part of the pay roll of \$113,000, which was paid Tuesday, was for the workmen on the new blast furnace.—Chicago Industrial World.

The old Powell & Douglas pump manufactory buildings, in Waukegan, which were deserted by this firm for their new quarters two years ago, have been purchased by Mr. Manny, who will proceed to put in new machinery and rebuild the works for the manufacture of agricultural implements.

The Thunder Bay Iron Mining Co., Chicago, was incorporated during the week, with a capital of \$500,000, and the following gentlemen as incorporators: B. H. Jones, E. E. Hannah, and C. P. Wheeler.

Three new machines have been added to the St. Charles File Works, in which 30 men are employed.

The Globe Iron Works, of Chicago, have just received the contract for the iron work on the new round house, boiler and machine shops of the Pittsburgh Fort Wayne and Chicago Railroad, in this city; also for additional iron work on the new City Hall amounting to \$35,000.

The Superior Barbed Wire Company, of Chicago, was organized the past week with a capital of \$100,000, and the following well-known gentlemen as incorporators: Reuben Ellwood, J. F. Glidden, J. L. Lott, Hiram Ellwood and Isaac L. Ellwood.

MICHIGAN.

The citizens of Waukegan want a furnace located at that point, and offer liberal inducements. There is no better opening on the range for the investment of capital.—Marquette Mining Journal.

The following table exhibits, in gross tons, the total lake shipments of iron ore the present season, up to and including July 13, together with the amount shipped during the corresponding period last year:

Where from.	1880.	1881.
Escanaba.....	442,761	402,259
Marquette.....	250,172	217,846
L'Anse.....	15,965	16,379
Total.....	708,938	727,185

An increase of 18,287 gross tons.

Besides these shipments, there were pig iron, ore and quartz shipped as follows:

PIG IRON.	QUARTZ.
Carp River Iron Co.'s furnaces.....	2,630
Pioneer Furnace.....	487
Total pig iron.....	3,117

Carp River Iron Company	1,096
Ore to local points.....	11,789

Total ore, pig iron and quartz..... 251,118
—Marquette Mining Journal.

Carp River Furnace was blown in again on last Thursday, and is now running satisfactorily.

The consumption of iron at the Peninsular Car Works, at Adrian, averages about 61 tons daily. Of this amount 50 tons are in castings and 11 tons in bar or merchant iron.

KENTUCKY.

The Kenton Furnace stopped last week to clean boilers, and is now again in blast, making from 13 to 14 tons of mostly No. 1 charcoal foundry metal. A lot of some 35 tons of warm blast car-wheel iron was made here the other day as a trial experiment. The reports from Cincinnati speak very highly of its quality, so that this effort may be repeated. The present blast, which will likely reach 2000 tons, will not be completed till the latter part of winter.

The nail mill, rolling mill and keg factory

departments of the Norton Iron Works have shut down for the present. The furnace is still turning out her usual quantity of iron.

TENNESSEE.

With the end of June the firm of Gray, Kirkman & Fall, of Nashville, was dissolved, John Kirkman retiring. The remaining partners continue under the name of Gray, Fall & Co. Mr. John Kirkman, who thus withdraws from active commercial life, may be called the pioneer of the hardware business in the South. He has been closely identified with this branch of trade for over half a century in Nashville, and was originally of the old firm of H. & J. Kirkman, afterward Kirkman & Ellis, and a member of the firm from which he now retires for the past fifteen years. He is now, and has been for a long time, president of the Commercial Insurance Company, also of the Third National Bank of Nashville. The remarkable advance and popularity of this bank, which is one of the largest and most successful institutions of the kind in the South or West, is due principally to Mr. Kirkman's financial ability and keen business foresight. He retires from the hardware business with wealth and honor, and in the highest esteem of every one with whom he was so long connected.

LABOR AND WAGES.

A party of laborers on the construction of the New York, Chicago and St. Louis Railroad struck for \$1.75 per day, an increase of 25 cents. Part of the gang refused to strike, and the strikers assaulted them with rocks and clubs, and being in the majority, drove them from work. Several were seriously hurt. The strikers were discharged. The workmen at West Middlesex, Pa., who struck for two weeks pay were idle for seven weeks. They won in the end, but did it pay!

It would be well if all business requiring labor around furnaces could be arranged like glass manufacturing—the concentration of work into ten months of the year and have July and August "off months." Such a plan would tend, through restriction of output, to make steady employment during the working part of the year and give workmen the hot months for recreation. A week of work when the thermometer ranges as high as it has recently is as great a strain on the muscular and nervous systems as a month's hard labor in cooler seasons. What do you think of the suggestion?—Amalgamated Association.

One of the Isabella furnaces, Pittsburgh, is shut down at present. On Thursday the workmen asked for an advance from \$1.25 to \$1.50 per day. The firm refused and sent to New York to engage a lot of Swedish emigrants at Castle Garden to fill the places of the strikers.

Despatches from Cincinnati, under date of the 18th, are as follows: The Cincinnati Rolling Mill started to work this morning, after a rest of two months on account of a strike. Non-union men are employed, at Pittsburgh prices. Another rolling mill is preparing to start in the same way, and the proprietors say they will have no difficulty in procuring workmen.

The Ohio Iron Co., Zanesville, who, it will be remembered, refused to be dictated to by the Amalgamated Association, and declined to employ union men, are running their works full, with a crew of non-union men. This is five rolling mills running in the West that are running in defiance of the union.

The miners at Jackson City, Mich., have been on a strike for eleven weeks.

Non-Union Labor in Western Mills.

The latest information we have from Cincinnati, which is of date Tuesday, is that the new Cincinnati rolling mill, the old Cincinnati Railway Iron Works, which has been rebuilt under the direction of Mr. Samuel Danks, has been able to start its Danks' puddlers with non-union men. They have also engaged some former union men who have seceded from the union for a plate mill crew and hammermen. The other firms are in no hurry to start up, and seem determined to beat the union. The Zanesville mill, as we have stated in another place, are running full with a crew of non-union men. Burger's, at Portsmouth, Ohio, is running in defiance of the union, as is Scottsdale, Pa.; Wellsville, Ohio, and W. D. Wood & Co.'s, McKeesport. At the latter works, in which Mr. Wood allows no union men to work, 23 knobblers and hammermen who joined the union Saturday night were discharged Monday morning. It looks as though some one else besides the Amalgamated Association proposed to have something to say as to how their mills should be run, and do not render assent to the idea that this union is the only body that knows anything.

The industrial exhibition at Milan is described by correspondents as a striking success. It is really the first opportunity which Italy has had to show her position in the arts and industries since "Free Italy" was established, and the evidence is conclusive that her people have not been indolent. The exhibition originated with the Milan Chamber of Commerce in 1879, and the idea then conceived has resulted in the present magnificent buildings. A not unimportant feature of the exhibition is the specimens of the mineral wealth displayed. Chief among these products are iron, sulphur, copper and marble. Several English companies are working Italian mines; one is working the sulphur mines at Casena, and another exhibits its valuable specimens of gold ore. There is a large mining company established at Turin, while the only tin mines in Italy are in the Province of Fisa. In all the other mines, which are numerous, the work is entirely Italian, and one has only to study the numerous machines and the great engines which have been manufactured at Milan, Genoa, Turin and Bologna, to see how thoroughly the working of iron is understood.

The board of directors of the Matanzas exhibition have been authorized by the government to close its doors from the 4th inst. until December next, when the exposition will be reopened.

Special Notices.

**SECOND-HAND AND NEW
MACHINISTS' TOOLS.**

In Store July 6, 1981.

One 66 in. x 13 ft. Horizontal Boring Lathe. Pond.
One Engine Lathe, 35 in. x 18 ft. Putnam.
One Engine Lathe, 27 in. x 12 ft. Good order.
One Engine Lathe, 34 in. x 8 ft. Pond.
One Engine Lathe, 30 in. x 24 ft. Pond.
One Engine Lathe, 27 in. x 12 ft. Pond.
One Engine Lathe, 25 in. x 14 ft. Ames, new.
One Engine Lathe, 24 in. x 12 ft. Filfield, New.
One Engine Lathe, 27 in. x 12 ft. McKim's Works.
One Engine Lathe, 20 in. x 10 ft. Biadell, At order.
One Engine Lathe, 13 in. x 6 ft. Ames, new.
One Engine Lathe, 24 in. x 12 ft. Putnam.
One Engine Lathe, 22 in. x 20 ft. Putnam.
One Engine Lathe, 20 in. x 13 ft. Hewes & Phillips.
One Engine Lathe, 20 in. x 12 ft. Hewes & Phillips.
One Engine Lathe, 18 in. x 10 ft. Star, New.
One Engine Lathe, 20 in. x 10 ft. Pond.
Two Engine Lathes, 18 in. x 9 ft. Pond.
One 15 in. x 12 ft. Lathe, New. Sq. section.
Two Gould Milling Machines.
Two No. 4 Smith & Granger Millers.
One No. 3 Pratt & Whitney Millers, Lincoln.
One Gear Cutter, 24 in. "Gould."
Six Hand Lathes, 11, 12 and 15 in. s. e. x 4' to 7 ft. bed.
One 24 in. x 12 ft. Lathe, New.
One 14 in. Shaper. Hendry Mach' Co. New.
One 14 in. Shaper. Steptoe, New.
One 12 in. Shaper. New Haven, New.
One 6 in. "Hewes & Phillips."
One 26 in. x 2 ft. Planer. L. W. Pond. Good order.
One 20 in. x 2 ft. Planer. L. W. Pond. Filfield, New.
One 24 in. x 7 ft. Planer. Whitcomb, New.
One 14 in. x 14 in. x 1 ft. Punch Press. Bliss & Williams?
One No. 5 Wilder Steam Gearing. New.
One No. 1 and 2 Sturtevant, Blower.
One No. 3 Root Blower.
One 60 in. Ferris & Miles Steam Hammer.
One 100 in. "Eccles Steam Hammer."
One 100 in. Ferris & Miles Steam Hammer. Nearly new.
One 80 in. Ferris & Miles Steam Drop Hammer.
Beltting, Shafting, Pulleys and Miscellaneous Machine.

E. P. BULLARD, 14 Dey St., New York,
GENERAL EASTERN AGENT FOR
Akron Iron Co.'s Hot Polished Shafting.

Having Purchased the Extensive Works

NEW CASTLE MFG. CO.,
New Castle, Pa.,

and greatly enlarged it by the removal of our complete stock of the most modern tools from our late works at Sharpsburgh, Pa., we are prepared to execute in the most rapid and thorough manner any work placed in our hands.

We shall be happy to submit estimates on
**Furnace, Steel Works, or Rolling
Mill Machinery.**

Whitwell Hot Blast Agents and
Contractors.
Witherow & Gordon,

Main Office, Cor. Market & Water Sts.,
Pittsburgh, Pa.
Works, - - - New Castle, Pa.

**Nut and Bolt Machinery
FOR SALE.**

One No. 1 Nut Machine, capacity $1\frac{1}{2}$ inch nuts (Bolt, hexagon and square, and all smaller).
One No. 1 Washer Machine, capacity all washers on the list.
Two No. 2 Washer Machines for $\frac{3}{4}$ in. washers and under.
No. 3 Nut Machine for $\frac{1}{4}$ in. nuts and under.

One Circular Shears for cutting sheet metal.
One Circular Saw for cutting sheet metal.
One Double Head Bolt Cutters, automatic stop for all threads to 1 1/2 in.
Six Bolt Pliers for 1 in. bolts and under.
Six Crank Planers, especially intended for rapid die making or short surface planing, particularly adapted for use in tool rooms for cut machines.

One each 4 and 6 spindle Nut Tappers.
These machines are either completed or will be in
two weeks, and are the same we have hereto-
fore furnished so successfully to belt manufacturers,
or builders, iron works, rail mill, railway, &c.,
in this country and Canada. Our last lot of six each
No. 2 Nut Machine and No. 2 Belt Headers are all sold,
and it will be about a week before we shall be able to

YORK & SMITH,
CLEVELAND, OHIO.

For Sale.

A Morgan, Williams & Co. 3000 lb. Steam Hammer. Has been used but little, and is as good as new.

Poppett Valve Engine, cylinder 24 inches diameter, 4 ft. stroke; cylinder and bed plate new. Made by Robinson, Rea & Co. Extra heavy for milling mill work. Bed plate weighs 12 tons. Everything of best workmanship and extra substantial. Four Housings for 16 in. rolls, with steel screws and screw boxes: all complete.

535-lb. Peck Drop, entirely new; never used.
10-horse power Baxter Engine.
Also three second-hand steam pumps.
One Direct-Acting Niagara Steam Pump, 10-inch
stroke. Steam cylinder 9 inches, water cylinder 5
inches diameter.
One Direct-Acting Blake Steam Pump, 16-inch

One Direct-Acting Blake Steam Pump, 14-inch stroke. Steam cylinder 14 inches, water cylinder 8 inches diameter.

The Sherman Process Co.

Issue Licenses to use the Process for the
Manufacture of Iron and Steel
in the Bessemer Converter, Crucible, Siemens-
Martin, Puddling, Blast and Cupola Furnaces.

The use of this Process improves the quality of the product, saves fuel and labor, and does not require any change in furnace or manner of working. See page 17 of *The Iron Age* of Oct. 25th, 1877.

J. SEIDEL,

COMMISSION MERCHANT,
Macana, Cuba. Box 662.

Will be happy to accept the representation of
first-class houses manufacturing hardware.

References on file at the office of the *American Reporter*, 86 Duane Street, New York.

Anderson Bros. Steel Co.

A limited number of shares for sale by
EDWARD FRITH & SON,
341 Pearl street, New York.

Trade Report.

Office of THE IRON AGE.
WEDNESDAY EVENING, July 20, 1881.

The chief disturbing influence of the week has been the continued cutting of rates by the trunk-line railroads, over which Pool Commissioner Fink seems to have no control whatever, and the demoralizing effects are more or less apparent through the whole line of speculative shares. The bears have not scrupled to avail themselves of the opportunity to depress prices. Under the circumstances, it is considered doubtful whether favorable advices respecting the crops or the important industries of the country could have any effect, for the time being, in checking the antics of professional "scalpers." It is noticeable, however, that the trunk-line shares, the immediate object of attack, are well sustained. Early in the week there was a partial recovery, arising from a reported settlement of differences between the pool line managers, but these proved illusory and there was a partial relapse. The injunction granted by Judge Barnard to restrain the payment of dividends on Western Union Telegraph stock also had an unsettling influence. The Elevated Railroad shares were not affected by the appointment of two receivers for the Manhattan Railroad (Judge Dillon and A. L. Hopkins), but they remained quiet, despite the previous sharp decline. On Monday and Tuesday the bears raided Central New Jersey and Union Pacific, and the lowest prices of the week were recorded on Tuesday afternoon.

United States bonds on Tuesday declined $\frac{1}{4}$ @ $\frac{1}{2}$, following a previous weakness due to the sale of some \$500,000 extended 5 per cents on account of the Indian Trust Funds, which movement at first was misunderstood. Later, government bonds were strong and higher. State bonds were dull, irregular and generally lower. To-day Tennessee 6s, new, declined to $73\frac{1}{2}$ from $75\frac{1}{2}$, and ditto 6s, old, to $73\frac{1}{2}$ from 74 . South Carolina 6s, non-fundable, advanced to $9\frac{1}{2}$, and Louisiana Consols to $66\frac{1}{2}$.

The highest rate paid for loans on call during the week was 4%, and that only on few transactions, the rate being $2\frac{1}{2}$ @ 3% .

The posted rates for bankers' sterling were reduced on Tuesday to 4.84 for 60-day, and 4.86 for sight; the market is steady. As the week closes, money is easy and promises to remain so, and the anomaly is witnessed of declining prices, despite the fact.

The importations of specie and bullion at this port during the week ending July 15 were \$136,574, consisting of \$63,614 in gold and \$72,960 in silver, as against a total of \$166,649 for the week ending July 17 last year. The importations since the 1st of January and since the 1st of August compare as follows with the movement during the corresponding periods last year:

	Since January 1—1881.	1880.
Gold.....	\$28,297,748	\$1,998,385
Silver.....	3,674,774	3,091,028
Total.....	\$31,972,522	\$5,089,413
	Since August 1—1880-81.	1879-80.
Gold.....	\$9,575,716	\$7,976,358
Silver.....	4,746,185	6,068,536
Total.....	\$14,321,901	\$14,044,894

The weekly bank statement was favorable, showing a gain of \$4,053,675 in surplus reserve, mainly on account of the gain in specie.

As above noted, stocks have been unsettled during the week by the cutting of rates on the trunk-line roads and unfavorable reports. In regard to the rumored meeting for to-day at the Pool Commissioner's office, Mr. Fink disavowed all knowledge of the matter. Comparing the sales of stocks at the beginning and close of the week, most of those on the list have declined, viz.: Western Union, 1; Northwestern, $3\frac{1}{2}$; Northwestern preferred, $3\frac{1}{2}$; St. Paul, $13\frac{1}{2}$; St. Paul preferred, $4\frac{1}{2}$; New Jersey Central, $5\frac{1}{2}$; Delaware, Lackawanna and Western, $1\frac{1}{2}$; Central Pacific, 5 ; Ohio Central, $2\frac{1}{2}$; Lake Erie and Western, 4 ; Rock Island, $3\frac{1}{2}$; Chicago, Burlington and Quincy, $6\frac{1}{2}$; Union Pacific, $2\frac{1}{2}$; Michigan Central, $3\frac{1}{2}$; Illinois Central, $2\frac{1}{2}$; Hannibal and St. Joseph preferred, 2 ; Morris and Essex, $1\frac{1}{2}$; Omaha, $\frac{1}{2}$; Omaha preferred, $2\frac{1}{2}$; Denver and Rio Grande, $4\frac{1}{2}$.

Government bonds declined $\frac{1}{4}$ @ $\frac{1}{2}$ for the $3\frac{1}{2}$ s (extended 5s and 6s), and advanced $\frac{1}{4}$ for the 4s and $4\frac{1}{2}$ s. The closing quotations were as follows:

	Bid.	Asked.
U. S. 4 $\frac{1}{2}$ s 1891 registered.....	114 $\frac{1}{2}$	115 $\frac{1}{2}$
U. S. 4 $\frac{1}{2}$ s 1891 coupon.....	114 $\frac{1}{2}$	115 $\frac{1}{2}$
U. S. 4s 1907 registered.....	116 $\frac{1}{2}$	117 $\frac{1}{2}$
U. S. 4s 1907 coupon.....	116 $\frac{1}{2}$	117 $\frac{1}{2}$
U. S. Currency 6s 1895.....	130	131
U. S. Currency 6s 1896.....	131	132
U. S. Currency 6s 1897.....	132	133
U. S. Currency 6s 1898.....	133	134
U. S. Currency 6s 1899.....	134	135
"Sixes" continued.....	105 $\frac{1}{2}$	106 $\frac{1}{2}$
"Fives" continued.....	101 $\frac{1}{2}$	102 $\frac{1}{2}$

The following is an analysis of the bank totals of this week compared with that of last week:

	July 6.	July 15.	Comparison.
Loans.....	\$312,866,800	\$314,744,400	Dec. \$1,877,600
Specie.....	77,728,500	81,046,900	Inc. 3,318,400
Legal t'ls.....	16,284,300	17,058,700	Inc. 774,400
Total.....	94,012,800	99,050,000	Inc. 5,037,200
Deposits.....	349,843,900	351,193,500	Inc. 1,350,600
Reserve required.....	87,460,750	87,799,875	Inc. 339,125
Surplus.....	6,534,050	11,057,725	Inc. 4,523,675
Circulation.....	10,110,200	10,181,300	Inc. 71,100

The following were the closing quotations for Mining Stocks:

	Bid.	Asked.
Amie.....	45	46
Alce.....	6.50	6.50
Alta Mont.....	4.90	5.00

American Flag.....	14
Bell tele.....	40
Bechtel.....	1.75
Big Pittsburgh.....	2.75
Bonanza C.....	13
Buckeye.....	13
Bull Don.....	1.60
Bulwer.....	2.30
Bodie.....	6.62 $\frac{1}{2}$
Boulder C.....	25
Boston C.....	25
Calaveras.....	13
Cale. B. H.....	1.70
California.....	70
Climax.....	48
Consolidated Virginia.....	1.25
Consolidated Imperial.....	15
Consolidated Pacific.....	10
Chrysolite.....	5.67 $\frac{1}{2}$
Cherokee.....	1.95
Caribou.....	2.50
Dunderberg.....	80
Dahlgren.....	6
Dunkin.....	54
Findley.....	28
Great Eastern.....	24
Gold State.....	2.25
Hoodlaw.....	40
Granville.....	5
Hibernia.....	63
Iron Silver.....	2.10
Lacrosse.....	4.40
Leadville.....	1.25
L. Chief.....	1.35
Little Pitts.....	2.30
Mariposa.....	3.00
Mar. Pref.....	4.40
Moose.....	95
Miner Boy.....	75
Navajo.....	70
North Star.....	78
Noonday.....	1.30
Ori. and Mil.....	91
Red Elephant.....	13
Rapahk.....	17
R. Sun.....	3.35
Robinson.....	9.62 $\frac{1}{2}$
South Hite new.....	34
San Pedro.....	4.25
Silver Cliff.....	54
Sutro.....	1.45
Stormont.....	2.00
Spr'g Val.....	2.90
St. L. No. 1.....	1.20
St. L. No. 2.....	1.30
St. L. 1 and 4.....	1.20
St. L. 2 and 3.....	4.25
Tloga.....	50
Tip Top.....	5.00
Tuscarora.....	23

GENERAL HARDWARE.

Considering the season, business is remarkably active. There are very few changes in prices to note, and the tone of the market is steady, with, as we have before remarked, an upward tendency in some lines of goods.

The Atlantic States Nail Manufacturers' Association held a meeting at Rocky Point, R. I., on Thursday last, at which the existing card price—viz., \$3.15 for rod, to 60d., less 10 cents per keg for carload lots and upward—was confirmed. The demand for Nails has been more active during the week, and we quote the market steady at \$2.90 @ \$3 for rod, to 60d., according to size of order.

The manufacturers of Wrought goods, such as Hasps and Staples, Hooks and Staples, Staples, Open Links, S Hooks, Hitching Hooks and Rings, Meat Hooks, &c., have advanced their prices to discount 70 and 10 per cent., instead of 75 and 10 per cent., as formerly.

The Charles Parker Company, Meriden, Conn., and No. 97 Chambers street, New York, have made the following changes in list prices of Coffee Mills:

Parker's Wood Back Mills.....	\$5.50
Improved Wilson, per doz.....	\$5.50
Parker's Patent Eagle Box Mills.....	\$5.50
No. 102, Iron Hopper, per doz.....	9.00
No. 104.....	8.50

Parker's Box, Coffee and Spice Mills.....	\$5.50
No. 1, Iron Hopper, per doz.....	8.50
No. 2.....	8.50
No. 3.....	8.50
No. 4.....	8.50

The discount from their entire list of Box and Side Mills is 40 per cent.

Logan & Strobbridge, New Brighton, Pa., have made the following changes in list prices of Coffee Mills manufactured by them:

No. 1, Iron Hopper, to.....	\$6.00
No. 3, Plated " to.....	8.50
No. 4, " " to.....	8.50
No. 10, " " to.....	10.00
No. 25, Brass " to.....	10.00
No. 100, Side Mill, to.....	5.50

All others same as 1880 catalogue.

The Stanley Rule & Level Co., make no changes in their discounts as published January 1, 1881.

We have received the following circulars:

NOTICE.
BINGHAMPTON, July 13, 1881.
GENTLEMEN: Fearing that the fire which occurred in our factory on the 10th inst. may give rise to some false impressions, we beg leave to say that although we have sustained some loss, our manufacturing will not be seriously impeded. Our machinery is to a great extent undamaged, and part of it is now in operation. We confidently expect to be in complete running order within a week, and believe we can fill our orders with a reasonable promptness. Trusting you will not withhold your patronage through any erroneous reports, we remain, respectfully yours,
CRANDAL, SPOON & CO.

The Manhattan Brass Company, First avenue and Twenty-eighth street, have issued, under date of July 1, a revised edition of their illustrated catalogue and price list. Some idea of the extent and variety of their goods will be obtained from their discount sheet, which we print below:

MANHATTAN BRASS COMPANY.

	Discounts July, 1881.
Burners.....	20
Lamps, all kinds.....	20
Shade Rings.....	20
Lanterns.....	20
Nickel Reflectors.....	20
Candlesticks.....	20
Nickel and Brass Trays.....	20
Gas Fixture Trimmings.....	20
Fire Bells.....	20
Fenders.....	25
Andirons.....	25
Coal Hops.....	25
Fire Place Frames.....	25
Sheet Brass.....	25
Brass and Copper Wire.....	30
Tubing.....	30
Brass Door Bell.....	30
Brass Checks.....	30
Brown's Picture Hooks.....	25
Brass Jack Chain.....	50 and 10
Iron Jack Chain.....	50 and 10
Match Safes.....	25
Mouth Pieces.....	25

Oilier Sets.....	25
Zinc and Tin Oils.....	50
Brass and Copper Oilers.....	50
Bill and Letter Files.....	50
Curtain Poles.....	25
Picture Poles.....	25
Lighting Rods.....	25
Baby Carriage Trimmings.....	25

The Norwalk Lock Company, South Norwalk, Conn., and No. 82 Chambers street, New York, have issued an appendix to their catalogue, in which they present illustrations of new goods added to their assortment since the publication of the catalogue referred to. Among the goods shown are several new patterns of Locks and Latches, Genuine Bronze Door Knobs, Bell Pulls, Escutcheons, Sash Fasteners and Lifts, Shutter Hinges, &c., Axle Pulleys (with plain and ornamental face), French Window Catches, Capboard Turns, Bronze Butts and kindred goods. The appendix covers 125 pages, uniform in size with their catalogue, and is accompanied by a revised price list of 23 pages.

We are informed that the firm of King, Briggs & Company will be dissolved August 1st, and the business of Hardware specialties conducted by them will be continued by Mr. Francis T. Witte, of the old firm, at No. 111 Chambers street. Mr. Ezekiah King will have an office at the same place, where he will be pleased to meet his friends in the trade.

BRITISH IRON MARKET.

LONDON, July 20, 1881.

[Special Report by Cable to The Iron Age.]

Scotch Pig.—A large business has been done during the week and prices are higher. An advance of 6d. on all brands is reported, to-day's quotation being:

Gartsherrrie, alongside, Glasgow.....	55
Coltness.....	57
Glenarnock " Ardrossan.....	52
Eglinton.....	48

Lighterage from Ardrossan to Glasgow is 2/6 @ 2/6 per ton.

Bessemer Pig.—An active market is reported, under an improved demand, and business has been heavy. Prices are firm. Lots equal portions Nos. 1, 2 and 3 are quoted 57 $\frac{1}{2}$, an advance of 1/0 on last week's figures:

Manufactured Iron.—The demand is increasing, and transactions have been large. Prices are steady. Best Staffordshire Bars are quoted 27.

Steel Rails.—The demand is large and business has been heavy. Prices are firm. We quote ordinary sections, 15, 15/10 @ 16, 5/.

Iron Rails.—There has been a steady demand during the week, and transactions have been large. Welsh are quoted steady at 15 @ 15, 5/.

Old Rails.—The offerings have been moderate and sales fair. Prices are firmer and higher. Old Tees being now quoted 14, 7/6.

Scrap.—Sales have been small and offerings moderate. Prices are firmer. Wrought Scrap is quoted 13, 15/.

IRON.

American Pig.—The demand for Pig Iron has improved during the week, and although nothing very heavy in the matter of sales is reported, a fair business in small lots, the aggregate of which is considerable, has been done. Sales of 1000 tons, Thomas, in lots at our quotations, are announced, and in other brands we hear of considerable business, the particulars of which are withheld. We quote: Foundry No. 1, \$23 @ \$24; Foundry No. 2, \$21 @ \$22; Gray Forge, \$20.

Scotch Pig.—The tone of the market is firm, and prices, although not notably higher, are stiffening. Sales during the week have been fair, and the arrivals have all gone into consumption. We quote as before: Eglinton, \$20.50; Carnbroe, \$22.50; Coltness, \$23.50; Glenarnock, \$22.50, and Gartsherrrie, \$23.50. Occasional sales of Middleboro' Iron are reported, and stocks are declining. No. 3 is quoted \$18.50 @ \$19.

Rails.—The inquiry for Steel Rails is active, and, for 1882 delivery, some large orders have been placed during the week. We quote Steel at mill, future delivery, \$53 @ \$56, while for earlier delivery quotations would range from \$57 @ \$60. For Iron Rails there is considerable inquiry, but no transactions worthy of mention are reported. We quote Iron Rails, \$43 @ \$49.

Old Rails.—Sales in lots aggregating about 1500 tons are reported. We quote T, \$26, and D. H., \$27 @ \$27.50.

Scrap.—Sales are reported of several hundred tons Wrought Scrap, ex store, at about \$26. We quote No. 1 Wrought, \$27 from store, and for prime selected from yard, \$30.

METALS.

Copper.—Little has been done during the week, dealings being confined to small lots Lake at 16 $\frac{1}{2}$. Apparently the mining companies are piling up their stock. Baltimore is nominally worth as much as Lake Copper. There is no change at London.

"London, July 2.—The statistics of Chili produce show the stock in first and second hands in Liverpool and Swansea to have been reduced during the last half of June to 30,475 tons, against 30,753 tons on the 15th ult., the imports and deliveries during that period being extremely light, the former being 415 tons and the latter 693 tons, against 3350 tons and 1057 tons respectively for the corresponding period of last year. The charters from Chili for the past fortnight have been 1800 tons and the price calculated at \$59, without any profit. The total charters from Jan. 1 to June 30 this year have been 17,850 tons, against 23,250

tons for the same period of last year, and 25,800 tons for the first six months of 1879, showing a decrease of 5400 tons as compared with 1880, and 7950 tons as compared with 1879. The total charters for the twelve months ending yesterday are also favorable, being only 35,250 tons, against 48,350 tons for the previous twelve months, or a decrease of 13,100 tons. We quote manufactures: Bottoms, 29 $\frac{1}{2}$; Braziers, according to size, 28 $\frac{1}{2}$ @ 34 $\frac{1}{2}$; Circles, 31 $\frac{1}{2}$ @ 34 $\frac{1}{2}$; Segment Sheets, 31 $\frac{1}{2}$; Fire-box Sheets, 28 $\frac{1}{2}$; Sheathing, 26 $\frac{1}{2}$, and Bolt Copper, 28 $\frac{1}{2}$.

Tin.—Our market has remained quiet, and prices are about unchanged; no large lots have been sold. Foreign markets are unaltered. London cables to-day \$90 for Straits on the spot, the market there being reported stronger, while Singapore quotes \$28.25 per picul, with an exchange of 3/9 $\frac{1}{2}$. Shipments from the Straits Settlements to the United States have been during the fore half of July 300 tons to the United States and 100 tons to England. We quote at the close, upon a firm market, large lots, Straits, 20 $\frac{1}{2}$ @ 20 $\frac{1}{2}$; Australian, 20 $\frac{1}{2}$ @ 20 $\frac{1}{2}$, and Billiton, 20 $\frac{1}{2}$. "London, July 2.—During the past week this market has been somewhat unsettled. It was depressed at the earlier part on account of numerous realizations being effected, and but little disposition being manifested on the part of operators to make purchases. Consequently down to Wednesday prices continued to give way, when as low as \$88, 5/ cash for foreign was accepted; from which point, however, a sharp rebound ensued, and yesterday the market recovered a considerable proportion of the fall which was made during the three previous days; while to-day it was \$89, 10/. The downward tendency of prices at the commencement of the week was not a matter of surprise, because previous to the fall there had been a marked rally in the value of this metal, and hence a pressure to sell at that particular time was only a customary occurrence, for invariably after any material rise, whether it be in this or in any other metal, there is the reaction which is generally prolonged or checked according to the firmness and disposition of holders."

Tin Plates.—Have been quiet, but strong, there being an active jobbing demand and a great deal of inquiry. At Liverpool the market is firm at 15/ @ 15/6 for Coke Tin and 10/ @ 21/ for Charcoal ditto. We quote at the close, large lines, ordinary brands, per box: Charcoal Bright, \$5.75 @ \$6.25; ditto Terns, \$5.25 @ \$5.50; Coke Tin, \$5.05 @ \$5.10, and ditto Terns, \$5.

Lead.—Great activity has reigned during the week in Common Domestic, of which 1500 tons changed hands at \$4.70 @ \$4.75. The market is now pretty completely swept of all offered at 4 $\frac{1}{2}$ ¢; the price of 4 $\frac{1}{2}$ ¢ is now asked with a hardening tendency, the demand outstripping the supply. Refined.—All available Lead until October has been taken out of the market. Some concerns sold out till September, and the Leadville smelters are advancing prices. "London, July 2.—Prices for this metal continue steady, business chiefly being carried through at last week's rates. There is, however, still little or no activity in the demand, buyers continuing to limit their purchases only to actual and most pressing wants." Manufactures are quoted as follows: Sheet Lead, 7 $\frac{1}{2}$ ¢; Lead Pipe, 7¢; Tin-lined ditto, 15¢; Block Tin ditto, 35¢; Drop Shot, 6 $\frac{1}{2}$ ¢.

Spelter and Zinc.—Common Domestic Spelter continues improving. Producers say that they cannot place any on the market here for less than 5¢, and that many of them have been crippled. The quotation is now 5¢ @ 5 $\frac{1}{2}$ ¢ for Common Domestic, and 5 $\frac{1}{2}$ ¢ for Silesian. In Europe, upon the strength of reports of a renewal of the syndicate, Spelter has risen. It is thought that the lower prices of Brass are likely to stimulate the consumption of Spelter. Sheet Zinc is worth 7¢. "London, July 2.—Quotations for this metal have assumed an upward tendency, perhaps more on account of the increased activity in the Galvanized Iron trade than from any other cause." It is reported from Dortmund—the center of the Rhenish-Westphalian Iron industry—that the demand for Galvanized Iron goods of all descriptions in Germany is assuming proportions which hitherto had hardly been deemed possible, and as this is confirmed from England also, the movement on the Continent—supported, as it is, by the common action of producers—is apparently a legitimate one. It will, therefore, not unlikely be attended with better and more permanent results than those of the syndicate early in 1880. We hope so sincerely, as Spelter stood pressingly in need of a vigorous lift.

Antimony.—A fair amount of jobbing business is being transacted at 14 $\frac{1}{2}$ ¢ for Cookson as a basis.

FOREIGN TRADE MOVEMENTS.

The following is a summary of the foreign trade movements for week ended July 20:

	1879.	1880.	1881.
Total.....	\$4,741,303	\$9,988,380	\$9,276,271
Prev. reported.....	758,569,243	205,374,448	221,871,872
Since Jan. 1.....	\$163,250,636	\$755,368,837	\$331,148,593

Included in the imports of general merchandise for the week were articles valued as follows:

of them have been crippled. The quotation is now 5¢ at 5½¢ for Common Domestic and 5½¢ for Silesian. In Europe, upon the strength of reports of a renewal of the syndicate, Spelter has risen. It is thought that the lower prices of Brass are likely to stimulate the consumption of Spelter. *Sheet Zinc* is worth 7½. "London, July 2.—Quotations for this metal have assumed an upward tendency, perhaps more on account of the increased activity in the Galvanized Iron trade than from any other cause." It is reported from Dortmund—the center of the Rhenish-Westphalian Iron industry—that the demand for Galvanized Iron goods of all descriptions in Germany is assuming proportions which hitherto had hardly been deemed possible, and as this is confirmed from England also, the movement on the Continent—supported, as it is, by the common action of producers—is apparently legitimate only. It will, therefore, not unlikely be attended with better and more profitable results than those of the syndicate.

Dutch East Indies.	
Ptln., gals. 497,150	60,855
Stettin.	
Ptln., gals. 46,190	38,961
Elisnore.	
Ptln., gals. 118,005	25,597
Christiansand.	
Ptln., gals. 107,018	14,110
Antwerp.	
Ag. imp. pks. 2	100
Mf. iron, pks. 58	609
Ptln., gals. 144,027	117,536
Sew. ma., cs. 26	20
Hdw., cs. 27	587
Gothenburg.	
Ptln., gals. 100,775	8,100
Napht., gals. 53,823	4,306
Fredericia.	
Ptln., gals. 107,053	15,760
Rotterdam.	
Pumps, pks. 3	130
Mf. iron, pks. 4	610
Clocks, bxs. 10	146
Hdw., cs. 1	50
Ptln., gals. 237,414	18,000
Copper, bxs. 27	1,001
Mach'y, pks. 7	45
Odessa.	
Ptln., gals. 232,430	27,500
Stockholm.	
Ptln., gals. 281,775	23,542
Bremen.	
Napht., gals. 146,885	14,700
Ptln., gals. 259,370	21,000
Mf. iron, pks. 3	475
Hdw., cs. 125	2,118
Copenhagen.	
Mf. iron, pks. 8	315
Ag. imp. pks. 5	237
Amsterdam.	
Clocks, bxs. 3	160
Danish West Indies.	
Ptln., gals. 1,390	200
Hdw., cs. 1	68
Nails, kgs. 27	113
Mf. iron, pks. 28	88
Pumps, pks. 1	50
Bristol.	
Ptln., gals. 209,272	18,831
Clocks, pks. 15	249
Liverpool.	
Mf. iron, pks. 16	2,167
Sew. ma., cs. 115	5,152
Hdw., cs. 75	4,026
Valves, cs. 1	100
Ag. imp. pks. 27	1,113
Mach'y, pks. 20	1,684
Clocks, pks. 345	9,376
Met. g. ds., cs. 1	60
French West Indies.	
Ag. imp. pks. 3	50
Ptln., gals. 550	610
Sew. ma., cs. 6	50
Hdw., cs. 1	34
British West Indies.	
Ptln., gals. 16,800	2,134
Mf. iron, pks. 32	464
Pig. mtl., pks. 8	35
Clocks, bxs. 10	388
Revolvers, cs. 2	230
Tinware, cs. 3	58
Nails, bxs. 12	47
Hdw., pks. 14	1,469
Nails, kgs. 436	1,518
Ag. imp. pks. 17	230
Mach'y, pks. 32	776
Sew. ma., cs. 214	214
Boiler, cs. 1	460
Pumps, pks. 1	3
New Zealand.	
Ag. imp. pks. 159	50,659
Wire, bxs. 125	4,380
Cette.	
Ptln., gals. 148,918	11,098
Dunkirk.	
Ptln., gals. 187,341	11,238
Cuba.	
Mf. iron, pks. 182	1,812
Iron plates, 40	310
Scissors, pks. 4	366
Ag. imp. pks. 1	1,910
Tacks, cs. 7	46
Nails, kgs. 215	871
Heaters, 2	643
Pumps, pks. 1	460
Lead, pks. 10	40
Mach'y, pks. 140	23,441
Hdw., pks. 133	3,096
Clocks, bxs. 3	79
Lead, box 1	20
Steel, pks. 10	1,607
Iron, bds. 10	300
Copper, coils, 2	300
Nails, cs. 11	98
Ptln., gals. 10,550	1,232
Fuenfuela.	
Pumps, pks. 1	73
Met. cs. 1	955
Ptln., gals. 41	510
Hdw., pks. 80	807
Mach'y, pks. 88	1,168
Nails, kgs. 2	35
Brasilia.	
Ptln., gals. 92,668	11,324
Pld. ware, pks. 21	3,362
Cutlery, cs. 79	3,300
Mach'y, pks. 90	3,443
Cotton gins, cs. 9	375
Sew. ma., cs. 130	3,650
Clocks, bxs. 33	710
Pumps, pks. 9	286
Rifles, cs. 1	17
Iron safes, 4	370
Hdw., pks. 679	9,043
Mf. iron, pks. 142	2,013
Pistols, cs. 4	313
Nails, cs. 1	12
Pumps, pks. 5	250
Ag. imp. pks. 38	500
Needles, pks. 2	21
Argentine Republic.	
Hdw., cs. 115	4,541
Ag. imp. pks. 204	84,090
Cutlery, pks. 60	1,609
Ptln., gals. 34,000	3,550
Mf. iron, pks. 12	794
Sew. ma., cs. 52	470
London.	
Mach'y, pks. 16	2,975
Hdw., pks. 158	4,212
Clocks, pks. 125	9,047
Scissors, pks. 64	975
Bells, cs. 1	130
Pld. traps, pks. 7	102
Mf. iron, pks. 33	712
Ag. imp. pks. 94	1,680
Sew. ma., cs. 305	7,506
Boiler, cs. 1	3,520
Glasgow.	
Quan. Val.	
Tin plate, cs. 6	180
Copper, keg. 1	50
Ox. zinc, bds. 100	932
Mach'y, pks. 18	2,617
Hdw., pks. 7	1,200
Sew. ma., cs. 55	3,125
Mf. iron, pks. 2	270
Iron safe, 1	150

though of a more conservative turn, believes the market will require this year, 26,000,000 tons, but Mr. Gowen's figure is 28,000,000. At present, as we are informed, the market is taking coal quite well. This is the purport of remarks at the Pennsylvania Co's office, also at the office of the Consolidation Company, where business is described as "moving along quietly and orderly, though there is no boom." Respecting the much-talked-of advance in August, while some are strongly in favor of such a measure, others gravely question its expediency. The managers have the subject under advisement, and will reach a conclusion in the coming week. The Pottsville Miner's Journal says that "if any change in prices is made for August it will be slight, and that only for the best grades, but a general advance along the whole line may be expected in September." Quotations are unchanged, viz.: Lehigh, Lump, \$4.40 @ \$5.25; Grate, Egg and Stove, \$4.25 @ \$4.45; Wyoming, \$3.75 @ \$3.90 for Lump and Grate; other sizes, \$3.90 @ \$4.50.

The total tonnage of Anthracite Coal from all the regions for the week ending July 9, amounted to 361,889 tons, against 393,084 tons in the corresponding week last year. The total for the year is 13,058,455 tons, against 10,776,392 tons for the same period last year. The quantity of Bituminous Coal sent to market for the week amounted to 86,788 tons, against 75,057 tons in corresponding week last year. The total amount of Bituminous mined for the year is 2,484,332 tons, against 2,096,804 tons for the corresponding period last year. Bituminous Coals are unchanged at rock bottom prices. It is denied that prices are "unsettled," the low figures reached being firmly held. Cumberland and Clearfield are \$3.25 @ \$3.50 at Baltimore, and \$4.50 at New York.

Vessels are scarce, and the rates to Providence are 75¢ @ 80¢; to Boston, \$1.25 @ \$1.30.

Coal is in active demand at the mines for Western consumption. At the Ebervale collieries, after 11 weeks' suspension on account of the strike, work will be resumed to-morrow.

OLD METALS, PAPER STOCK, &c.

The purchasing prices offered by dealers are as follows:

Copper, heavy	10.14	10.15
Copper, bottom	10.14	10.15
Yellow Metal	10.14	10.15
Brass, heavy	10.14	10.15
Brass, light	10.14	10.15
Composition, heavy	10.14	10.15
Lead, heavy	10.14	10.15
Tea Lead	10.14	10.15
Pewter, No. 1	10.14	10.15
Pewter, No. 2	10.14	10.15
Wrought Iron	10.14	10.15
Light do.	10.14	10.15
Stove Plate	10.14	10.15
Machinery do.	10.14	10.15
Grate Bars	10.14	10.15

The prices current for Rags, &c., are as follows:

Canvas, Linen	10.14	10.15
White Cotton, New	10.14	10.15
White, No. 1	10.14	10.15
White, No. 2	10.14	10.15
Second	10.14	10.15
Soft Woollens	10.14	10.15
Mixed Rags	10.14	10.15
Gunny Bagging	10.14	10.15
Kentucky Bagging	10.14	10.15
Book Stock	10.14	10.15
Newspapers	10.14	10.15
Waste Paper and Scraps	10.14	10.15
Kentucky Bale Rope	10.14	10.15

The heaviest consumers appear to be well stocked, however, and are not inclined to meet the rates asked. Since the first of the month we have heard of two or three small lots at over \$23, although one 10,000-ton lot is believed to have been taken at \$23.75. The market may be called quiet and steady at about \$24 asked, for full shipments, with buyers at \$22.50 @ \$23.

Blooms.—The demand is very active, and makers nearly all sold ahead. Prices are firm as last quoted, viz.: \$62.50 @ \$65 for Cold-blast Charcoal; \$55 for Run-out Anthracite, and \$45 @ \$47.50 for Scrap Blooms.

Muck Bars.—There is a considerable business doing, and prices are firm. Good lots have been obtainable during the week at \$38 @ \$38.50, but there is a disposition to hold for a half dollar advance, which will probably be realized at an early date.

Structural Iron.—The demand is increasing rather than otherwise, and manufacturers are almost uncomfortably crowded with work. It is impossible to give details in times like these; business is not confined to one large contract, but reaches every department. Prospects are excellent, and prices firm at 2.6¢ for Angles, 3.1¢ for Tees, 3.3¢ for Beams and 3.4¢ for Channels. Sales reported to day of 2000 tons in one lot, and an offer made for 1000 tons additional.

Bar Iron.—The demand is unusually large, and a heavy business has been done, generally at some little advance in prices. Quotations are nominally unchanged, but full prices are realized, and it is difficult to place orders in quantity even at current rates. Some large orders have been on the market, but lots of 100 to 200 tons appear to be taken in preference to those calling for larger quantities. Since last week we have heard of no transactions at less than 2.4¢, and for small lots 2.5¢ is the usual rate. The mills are full for three or four weeks to come, and might readily load up to twice the amount, but manufacturers are satisfied to meet the demand as it comes without engaging too far ahead. The outlook is in all respects satisfactory, with indications of a heavy run of business at unchanged, but steady prices.

The usual monthly meeting of the owners of the Philadelphia mills was held yesterday, at which the basis for labor was continued at 2.4¢, which may also be regarded as the actual firm selling price.

Plate and Tank Iron.—The demand appears to be entirely beyond the supply, and orders for large quantities are on the market waiting for takers. Some heavy sales were made last week, not only to the local trade, but for delivery at Buffalo, Chicago and other Western cities. Buyers are waiting to place their orders at first opportunity, but manufacturers are under contract to such an extent that they are unwilling to increase their engagements at present. Prices are very firm, and higher figures could be realized in most cases, if the orders could be filled promptly. In such a market it is difficult to quote satisfactorily, but latest sales have been at about 3¢ for Tank Iron, 3 1/2¢ for Refined, 3 1/2¢ for Shell, 4 1/2¢ for Fire-box, and 5 1/2¢ @ 6¢ for Flange.

Sheet Iron.—The demand has increased rather than otherwise, and the urgency to place orders is something extraordinary. It was thought some time ago that the heavy orders had mostly been given out, but they are on the market again in larger amount than ever. It is impossible to quote prices with any degree of accuracy, most parties having rates of their own irrespective of what others are doing. To regular customers the following are as nearly correct as we can give—say:

Common Sheet, No. 26 to 28	4 1/2¢
Common Sheet, No. 26 to 28	4 1/2¢
Best Refined 1/4¢ @ 1/2¢ advance on the above	
Best Bloom Sheets, No. 26 to 28	6 1/2¢
Best Bloom Sheets, No. 26 to 28	6 1/2¢
Common Red Plates, 3-16 to 16	3-16
Blue Annealed, 3-16 to 16	3-16
Best Bloom Galvanized, discount	40 1/2
Second quality, discount	50 1/2

Wrought Iron Pipe.—The demand continues large, but prices show no improvement. Boiler Tubes are quoted 45 @ 47 1/2¢, and Gas and Steam Pipe, 65 @ 67 1/2¢ discount from list price.

Steel Rails.—There is a very active inquiry for Rails, both for present and future delivery. The former are difficult to obtain, but a few lots can be had occasionally at \$60 @ \$62.50, the latter rate named to day for a lot of foreign in store. The attention of the trade is concentrating on 1882, during which period an extraordinary consumption is anticipated. We mentioned last week that about 250,000 tons had been entered up to that time for 1882. Since then we learn of negotiations being in progress for 100,000 tons with American manufacturers, and for 50,000 tons with foreign makers, so that some extraordinarily large transactions may be looked for within the next 30 days. Sales are reported to the extent of 20,000 tons or more, and buyers feel inclined to place at least a portion of their orders at the rates now quoted. Prices are unchanged at \$55 @ \$56 at mill for American, and \$58 @ \$60 at tide for foreign. The latter appear to have the advantage when deliveries are required at Southern or Gulf ports, and to some extent for Western deliveries also.

Iron Rails.—There is a very active demand, and prospects of further sales in the course of a few days. Several inquiries are in the market for lots of 1000 to 2500 tons each, some of which will probably be closed this week. Manufacturers generally are not quite able to meet the deliveries as promptly as desired, although some have taken orders for August, September and October, and it is likely that others will fall into line very soon. Prices quoted at mill are about \$46.50 for 56's; \$43 for 55's; \$50 for 25's; and \$52.50 for 16's. For a large lot and favorable delivery, it is possible that slight concessions could be obtained on an order for 1000 tons or more. English rails are quoted at low prices, say, \$43 @ \$45, according to section, but we have not heard of any recent sales.

Railway Supplies.—The demand is fair and prices unchanged; Spikes quoted at 2.65¢ @ 2.75¢; Fish Plates, 2.4¢ @ 2.5¢, and Track Bolts, 3.25¢ @ 3.75¢.

Old Rails continue firm and quoted rates are same as last week, with no evidences of weakness on the part of holders. There has been no urgency to buy either, but all the sales we have heard of have been at full prices, say about \$26.25 in store. Several lots have been taken at \$26.25 or equivalent rates, and there are more buyers than sellers at prices involving concessions. Lots for shipment are held at about \$27, with sales at very nearly that figure. Doubles are held at \$28 and are rather scarce.

Crop Ends.—Are nominally \$27, but there are none on the market at present. Bloom Ends are offered at \$26 without finding buyers.

Steel Blooms.—There is a very active inquiry, and sales amounting in the aggregate to 10,000 tons have been made this week at \$6. 5/8, c. i. f., equal to about \$43 duty paid.

Old Car Wheels.—Are held at \$30; a sale of 200 tons was made a day or two ago, but price has not transpired. A sale of 250 tons was made last week at \$30, delivered at an interior point, with freight from Philadelphia at \$1.50. Another lot is held in Philadelphia, \$30 asked.

Scrap Iron.—The demand shows no improvement, and sales are slow at \$26 @ \$27 for Short, and \$28 @ \$29 for extra No. 1. Cast is dull at \$19 @ \$20.

Coke.—There is a good demand, and prices are steadily maintained as before quoted, say \$1.60 @ \$1.70, free on cars at ovens.

Nails.—Are in fair demand at about \$2.85 @ \$2.90, wholesale price.

Dallett & Co., of Philadelphia, have recently added to their list of agencies for pig iron that of the Temple, made by the Temple Iron Company, and the Marshall, made by Marshall Iron Company.

Rails and Railway Supplies.—There have been no sales of Steel Rails reported recently. Railway Supplies are in active request, and prices are firmer, in sympathy with Finished Iron. Splice Bars are quoted at 2.60¢ @ 2.75¢; Track Bolts, 3 1/2¢ @ 4¢; and Spikes, 2 1/4¢.

Steel.—There is an increasing demand, and the mills generally are busy; some of them can scarcely take the time to stop for stock-taking and repairs. It looks very much as if the dullness of the first half of the year is to be fully made up during the last half. Prices firmer, but unchanged. Best brands of Refined Cast Steel, 1 1/2¢; ditto Crucible Machinery, 7¢; Bessemer and Open-hearth ditto, 5¢ @ 5 1/2¢; ditto Spring, 4¢ @ 4 1/2¢; ditto Plow, 4 1/4¢ @ 4 1/2¢.

Scrap.—There is an increasing demand for some kinds of Scrap and prices are firmer, but without quotable change. We quote No. 1 Wrought at \$30 @ \$31 per net ton for selected Railway, and \$28 @ \$29 for ordinary; Car Springs, \$37 @ \$38; Car Axles, \$34 @ \$35; Machinery Metal, \$21 @ \$22, gross; Cast Turnings, \$15 @ \$16; Wrought Turnings, \$21 @ \$22, net. Old Car Wheels very dull; in the absence of sales may be quoted nominally at \$28 @ \$30.

Coke.—There has been very little change in the situation the past week, while there is a steady demand, and makers generally appear to have about all they can do. The consumption is not as large as it was a few months ago, owing to a number of Pig Iron furnaces having blown out, and, since the miners have resumed work at the old rates, prices are easier, but unchanged. We continue to quote in a regular way at \$1.60 per ton, delivered free on cars at ovens; \$1.75 @ \$2 for small foundry orders.

Coal.—Owing to the continued suspension of navigation there have been no shipments by river for several weeks, and as there is but little loaded and the down-river markets are all well supplied, river operators are very well satisfied with the present situation.

PITTSBURGH.

Office of The Iron Age, 77 Fourth Avenue, Pittsburgh, Pa., July 19, 1881.

The most important feature to note is the continued activity in Manufactured Iron, and while the raw article continues quiet, an improved demand for it is only a question of a little time. At no time since the boom of 1879-80 have the mills of Pittsburgh been so full of orders as at present, while owing to the intense heat for some weeks past, the production has been reduced from 20 to 30%, puddlers being unable to work more than half time.

Pig Iron.—The general position of the market is not materially changed from what it was a week ago. There is an increasing inquiry and a more confident feeling on the part of furnacemen, who feel that an increased demand is only a question of a few weeks at most, and they are hopeful of being able to realize better prices in the near future. Forge Irons may be quoted at \$21 @ \$21.50, 4 mos., for Native Ore Neutral, and \$22 @ \$22.50 for Lake Ore. Sales—1000 tons of the former at \$21.50, 4 mos., and 200 tons of the latter. Extra Red-short at \$25. Sales of Foundry grades all the way from \$22.50 to \$25, according to quality, although the latter is an outside price.

Bessemer Iron.—There is a much better feeling in view of the recent advance of imported Bessemer, which, according to present quotations, cannot be laid down in Pittsburgh under \$27 @ \$27.50 for the best brands, and everything else being equal, consumers will, of course, give the home-made article the preference.

Muck Bar.—Owing to the hot weather very materially pulling down production, there has been considerable activity in Muck Bar, and several sales have been made during the past week at \$38.50 @ \$39 for good neutral. Some of the mills are pretty well stocked, having piled up a good deal during the dullness in Manufactured Iron, but others have to buy, not being, for the reason above noted, able to keep their rolls in operation without so doing.

Manufactured Iron.—The activity noted for some weeks past continues, and as the production of nearly all the mills has been materially curtailed owing to the heat, they are all considerably behind with their orders, and it is difficult to place an order now for immediately delivery at any price. There has been great difficulty for some weeks past in filling orders as fast as desired, and in addition to the production being reduced by the heat preventing the men from working much more than half time, some of the mills are stopped taking stock and making repairs. Prices continue very firm and still tending upward. Bars may be quoted at 2.30¢ @ 2.35¢ for assortment orders, and 2.40¢ @ 2.50¢ for all Bars, 60 days, 2¢ off for cash. Sale of 200 tons, all small sizes, at 2.25 rates. It is difficult to quote Sheet, but for No. 24, 4¢ appears to be regarded as bottom. Skelp or Pipe Iron has gone up to 2.60¢ @ 2.65¢, and mills all oversold. Plate and Tank Iron very strong. It is rumored that a sale of 200 tons was made the other day at 3 1/2¢. It is difficult, in the present condition of the market, to quote correctly, as those buyers whose necessities are urgent are willing to pay strong prices for prompt delivery, and, as already stated, but few of the mills are in condition to take additional orders.

Nails.—There is no particular activity as yet, but the demand is increasing and manufacturers are growing more and more confident of an active fall trade. Prices are firm, but unchanged—\$2.75, 60 days, 2¢ off for cash, for carload lots and upward. As compared with Finished Iron, Nails are low, and an advance before long is probable. It is doubtful whether a contract could be made for future delivery at present quotations.

Wrought Iron Pipe.—Appears to be in sympathy with Manufactured Iron, as the demand has increased wonderfully within the past few weeks, and but few of the mills having an assorted stock are able to meet their orders promptly. Prices are decidedly firmer, and while discounts are still quoted at 6 1/2¢ @ 70¢, there are but few sellers at the outside figure. The discount on Boiler Tubes has been reduced to 45¢. Straight Oil Well Casing and Tubing remain unchanged at 70¢ per foot, net, for the former, and 20¢ for the latter, net.

CHATTANOOGA.

Office of The Iron Age, Market and 8th Sts., Chattanooga, July 18, 1881.

The heated term, in its greatest violence, has subsided. The thermometer still goes to the nineties daily, but is several degrees lower throughout the day than the average of the past twelve days. Business shows decidedly more life than has been before perceptible since the first of June, and orders for August and September are coming in quite freely. There is some weakening in prices, but not enough to justify any change of figures.

Pig Iron.—The tendency is to weaken, and the disposition to concede lower quotations is more prominent than it has been before this summer. There is a good inquiry for Foundry Grades. We quote: No. 1 Foundry, \$22 @ \$23; No. 2 Foundry, \$20 @ \$21; Gray Forge, \$18 @ \$19; White and Mottled, \$16 @ \$18; Car-wheel Metal, \$38 @ \$40.

Ores.—We quote: 50% Brown Hematite, per ton, \$2 @ \$2.75; Red Fossil, \$2 @ \$2.25.

Miscellaneous Articles.—Old Rails are quiet, in sympathy with the downward tendency of Pig. There is some demand for shipment, but quotations would have to be shaded to place any large lots. We quote them at \$26 @ \$28. Wrought Scrap, \$20 @ \$25; Cast Scrap, \$10 @ \$15; Old Wheels, \$28 @ \$30.

Nails.—The Nail market is very dull, and the tendency of prices down. We quote them nominally at \$3.10 rates for small lots. Large lots are placed as low as \$2.90, owing to payment and parties purchasing.

Manufactured Iron.—Bar Iron has a fairly steady market at \$22.25 rates. Spikes, \$3.15; Track Bolts, \$4; Trestle Bolts, \$4.50; Fish Plate, \$2.50.

Coal.—Householders are being asked \$4 per ton for lump, delivered. Manufacturers who failed to make contracts are paying as high as \$3 @ \$3.50 at the mines, loaded on cars. Coal has not been so high in the district since 1873, at this season of the year.

Coke.—We quote: Furnace Coke, \$3 per ton at furnace; Foundry, 10¢ @ 12¢ per bushel.

Steel and Iron Rails.—Steel Bars, \$62 @ \$64 at mill; Iron, \$50 @ \$52; Small, \$57 @ \$60.

BOSTON.

JULY 16.—The demand for Iron has continued moderate, but both holders and consumers are more confident than they were, and it is very evident that the burden of overproduction is bearing less heavily than it was. Consumption continues large, but there is very little if any disposition to speculate. We continue to quote American Pig Iron at \$23.50 @ \$24 for No. 1 X; \$21 @ \$22 for No. 2 X, and \$19 @ \$20 for Gray Forge. These prices are f. o. b. at the port of shipment. Small spot lots will command \$2 1/2¢ ton higher. Foreign Pig is more firmly held, and the continued advance in freights is reported to have impelled some importers to store their iron rather than to dispose of it at present rates. We quote Coltness and Langdon at \$23.50 @ \$24; Glengarnock and Gartsherrie at \$22 @ \$23; Carnbroe at \$21.50 @ \$22; Eglington at \$20.50 @ \$21, and Middleboro' at \$19 for No. 1, and \$17.50 for No. 3. Old Rails are held a trifle higher than they were, and though the demand is moderate, holders appear indifferent about selling at anything less than \$28 @ \$28.50 for American, and \$25.50 @ \$27.50 for Foreign. Manufactured Iron.—There is a firmer feeling in nearly all classes of finished iron, and manufacturers and dealers are disposed to reach for an advance of 5¢ per cwt. Cheap lots of Bars are pretty well cleaned up, and there is none offering in this market at better than \$2.20. Horse shoes are quiet and steady at 4 1/4¢ @ 4 1/2¢ lb. Swedish or Norway Iron is unchanged at \$3.75 for Bars and \$4.75 for Shapes. Plate Iron has continued to gain strength, and is selling at \$2.90 @ \$3 for Common Tank; \$3 for Refined; \$3.40 @ \$3.45 for Shell, and \$4.40 @ \$4.45 for Flange. Tubes are steady at 47 1/2 @ 50 ¢ discount from the regular list.

COAL.

Mr. Frank Gowen, of the Reading Railroad, who will start for Europe on Saturday, has been spending a part of this week in calling on our local coal agencies, and is quoted as expressing himself very confidently and favorably respecting the results of the current coal year. Another authority in coal matters, recognized as equally good,

The Plate mills are generally sold ahead of delivery, and as their present margins are small they have every inducement to press for higher prices. Nails are selling at \$3 @ \$3.10, though the nominal quotation in considerably above these figures. The Boston store prices of Steel are as follows: Best English Cast, 14¢ @ 15½¢; American ditto, 12¢ @ 12½¢; Bessemer Machinery, 5¢ @ 6¢; Crucible ditto, 7¢ @ 7½¢; Wedge and German, 7¢; English Spring and Calking, 7¢ @ 7½¢; American Spring and Calking, 5¢ @ 5½¢; Tire, 3½¢ @ 3¾¢; Sleigh Shoe, 3¢ @ 3½¢. Bacon & Co., of this city, are building up quite a large trade in an article of round Machinery Steel at 6¢ ¾ lb, which has probably never been excelled for accuracy of size and finish. Copper has been firm and in fair demand at about the same quotations last noted, say 16½¢ @ 16¾¢ for round lots of Lake. The jobbing price is 16½¢ @ 17¢. Manufacturers of Copper are selling about as follows: New Sheathing Copper at 23¢; Braziers, 25¢; Bolts, 25¢; Bottoms, 26¢; American Yellow Metal Sheathing, 16¢ @ 17¢; ditto Bolts, 10¢; English Yellow Metal Sheathing, 13¢ @ 14¢, in bond. Lead has sold at higher prices, but the demand is only moderate. New York lead can be landed here at about \$4.92 @ \$4.95, and Western producers decline to name quotations. One to 5-ton lots cannot be bought in Boston at much less than 5¢ @ 5½¢. The prices of manufactures are unchanged, as follows: Bar, 6½¢; Pipe, 6½¢; Sheet, 7¢; Tin-lined Pipe, 15¢; Tin Pipe, 40¢, all less 10% to the trade. No. 1 Solder, 11½¢. Spelter is also a trifle firmer, and carload lots of Western cannot be laid down here at less than \$5.20. Small lots bring \$5.40 @ \$5.50. Sheet Zinc is in fair demand at 6½¢ @ 7¢. Tin has continued in moderate demand at unchanged prices, and we quote 20½¢ @ 20¾¢ for Straits and English. Tin plates are in moderate demand at steady prices. We quote: Charcoal Bright, \$6 @ \$6.25; ditto Tarned, \$5.37½ @ \$5.50; Coke Tin, \$5 @ \$5.25; ditto Tarned, \$4.87½ @ \$5.12½.—Commercial Bulletin.

CINCINNATI.

JULY 17.—Pig Iron.—The extreme hot weather and the labor strike have materially lessened transactions throughout the West during the past week. There have been no sales worthy of note, and from present indications the same will obtain for the remainder of this month. The semi-annual footings of the production of Pig Iron in this region are now made up and are before us. As compared with the first six months in last year there has been a gain of about 15% in quantity. The statistics show that the consumption has been about 20% more than last year; part of the supply was drawn from other quarters. The stock remaining on hand is about 10% less than this time last year. It is the opinion of both producer and consumer that the present firm condition of the market will be more than fully sustained: No. 1 Hanging Rock Charcoal Foundry, \$26.50 @ \$27.50; No. 2, \$25 @ \$26.50; Forge, \$24 @ \$24.50; No. 1 Coke Foundry, \$23.50 @ \$24; Good, \$22.50 @ \$23; Bituminous, \$21 @ \$22; Silver Gray Softeners, \$20 @ \$21.50; Forge, \$19 @ \$21; Cold-blast Charcoal Car Wheel Irons, all numbers, \$35 @ \$38; Warm-blast, Cast @ \$35; Scrap, Wrought, \$1.10 @ \$1.40; Cast, 50¢ @ 75¢; Bar Iron, \$2.15 @ \$2.25, card rate.

LOUISVILLE.

Messrs. Geo. H. Hull & Co., Commission Merchants, report to us as follows, under date of July 15: A little more activity has characterized the market since our last, and some round lots for consumption have been sold, though not at an advance in prices. Furnaces are blowing out in different localities, either for repairs or on account of strikes among operatives, and more firmness will undoubtedly result therefrom. We quote for cash:

FOUNDRY IRONS.

No. 1 Hanging Rock, Charcoal.....	\$27.00 @ \$29.00
No. 1 Southern, Charcoal.....	25.00 @ 27.00
No. 2 Southern, Charcoal.....	23.50 @ 25.00
No. 1 Hanging Rock, Stonecoal and Coke.....	23.00 @ 25.50
No. 2 Hanging Rock, Stonecoal and Coke.....	21.50 @ 24.00
No. 1 Southern, Stonecoal and Coke.....	20.00 @ 23.00
No. 2 Southern, Stonecoal and Coke.....	18.50 @ 21.50
"American Scotch".....	20.00 @ 23.00
Silver Gray.....	20.00 @ 23.00
Scotch.....	20.00 @ 23.00

MILL IRONS.

No. 1 Charcoal, Cold-short and Neutral.....	21.00 @ 22.00
No. 1 Stonecoal and Coke, Cold-short and Neutral.....	19.50 @ 21.00
No. 2 Stonecoal and Coke, Cold-short and Neutral.....	18.50 @ 20.00
No. 1 Missouri and Indiana Red-short.....	25.00 @ 27.00
White and Mottled, Cold-short and Neutral.....	17.00 @ 19.00

CAR WHEEL AND MALLEABLE IRONS.

Hanging Rock, Cold-blast.....	35.00 @ 41.00
Alabama and Georgia, Cold-blast.....	35.00 @ 41.00
Kentucky, Cold-blast.....	35.00 @ 41.00
Hanging Rock, W. B.....	30.00 @ 35.00

W. B. BELKNAP & Co., Iron and Steel Merchants, Nos. 113 and 115 Main street, report to us as follows, under date of July 16: Bar Iron is advancing slowly and steadily. The light spring trade, bitterly complained of at the time, depressing prices abnormally, is now bearing fruit in a very early fall demand. Stocks are unquestionably light, and must be constantly replenished even during the extreme heat of summer, which is generally a dull season. The total advance since the lowest prices of April is from \$3 @ \$4 ¾ ton, with a good prospect of still further advance. Mills claim to be sold up for 90 days, and are refusing to book further orders. Were it later in the year, and cheap English Iron not threatening, there would doubtless be a boom. There is a positive dearth of Sheet Iron, scarcely any, either heavy or light, to be had. Hoops and Bands have advanced 10%, though it is between seasons on Hoop. Nails are held more firmly by the mills. Advances seem imminent in certain lines of goods that have been extraordinarily low, such as Springs, Steel Tire, &c. Combinations have held better this year than ever before.

ST. LOUIS.

Messrs. HOFFER, PLUMB & Co., Pig Iron and Iron Ore Merchants, 417 Pine street,

write as follows, under date of July 16: There is no change to report in the condition of this market, and quotations are as at last writing:

HOT BLAST CHARCOAL.

Missouri.....	\$26.00 @ \$27.00
Southern.....	25.00 @ 27.00
Ohio.....	25.00 @ 27.00

COKE AND COAL.

Missouri.....	26.00 @ 27.00
Southern.....	25.00 @ 27.00
Ohio.....	25.50 @ 24.50

MILL IRONS.

Cold-short.....	21.00 @ 22.00
Red-short.....	24.00 @ 25.00

CAR WHEEL AND MALLEABLE IRONS.

Missouri.....	28.00 @ 30.00
Southern.....	35.00 @ 38.00
Ohio.....	31.00 @ 42.00

NEW ORLEANS.

Messrs. MINNIGERODE & Co., dealers in Railway Supplies, &c., No. 61 St. Charles street, New Orleans, La., write as follows, under date of July 12, 1881: Since the date of our last communication to you we have to report that the Iron business in New Orleans has been very materially increased, one firm alone having sold something like 60,000 tons of new Rails during the months of May and June. These Rails have generally been purchased from foreign manufacturers at prices ranging from \$60.50 @ \$63 for Steel, according to section, and \$44 @ \$46 for Iron Rails, according to section. The great bulk of foreign Rails brought to this port are destined for roads west of the Mississippi, in the West and Southwest. It is estimated that fully 250,000 tons of foreign Rails will arrive at this port for distribution in the Mississippi Valley during the present year. The importation of Pig Iron from abroad appears to have met with some check. The arrivals during the past two months have been light; the same may be said of Old Rails. The stock in New Orleans, both of Pig Iron and Old Rails, is very light, but we hear of new orders being given during the past week for Scotch Pig. Every month's operations seems to add to the importance of this port as an entrepôt for foreign material of all kinds. The large companies between New Orleans and St. Louis are taxed to their full capacity in the transportation of Rails and other material from abroad. There is no doubt of the fact that New Orleans is becoming daily more prominent as a port of entry as well as a point of export. The grain movement down the Mississippi River has kept our barge lines fully employed, and as the cotton season advances we look for a still greater tax upon the resources of our river craft. The arrival of ocean vessels for the present year will undoubtedly be far in excess of any previous year, and, from present appearances, this state of affairs is likely to be increased for next year. The prices of material are at present about as follows:

Steel Rails, according to section.....	\$60.50 @ \$63.00
Iron.....	44.00 @ 46.00
Old T-Rails.....	26.50 @ 27.00
Old Double Heads.....	27.50 @ 28.00
Scotch Pig Iron, according to brand.....	24.00 @ 28.00

Bar Iron, in carload lots, 2½¢ rates, ex store, with slight concessions for larger orders. Fish Plates, angle or plain, 2.30 @ 2½¢ ¾ lb, delivered. Spikes, standard size, 2¼¢ @ 3¢, with the usual addition for lighter sizes. Track Bolts, 3¼¢ @ 4¢, according to specifications. Old Car Wheels may be quoted at \$27, gross, and Old Axles at 1½¢ per pound. Wrought Scrap is sold by dealers at about \$25 per net ton, and Cast Scrap at about \$20. Although the summer season is usually considered a dull time in New Orleans, the Iron interest has not been perceptibly affected; on the contrary, business of every character in this line appears to be very brisk, and the opinion of those who are best informed as to the matter is that a fine business may be expected during the summer and for the balance of the year.

BALTIMORE.

R. C. HOFFMAN & Co., Iron and Commission Merchants, report the Pig Iron market as follows, under date of July 18: The Iron market shows an improved feeling, with a good demand for best grades Wheel Irons. Prices are firm at about following rates:

Baltimore Charcoal Wheel Iron.....	\$35.00 @ 37.00
Virginia C. B. Wheel Iron.....	35.00 @ 37.00
Anthracite No. 1.....	24.00 @ 25.00
No. 2.....	23.00 @ 24.00
No. 3.....	22.00 @ 23.00
"Mottled and White.....	18.00 @ 20.00
Charcoal C. B. Blooms.....	60.00 @ 65.00
Refined Blooms.....	50.00 @ 55.00

W. N. WYETH, Iron and Steel Merchants, 46 and 48 South Charles street, reports us the following, under date of July 19: Trade rules tolerably active, with prices firm, as per annexed list:

Ref. Bar Iron, 1 to 6 x ¾ to 1.....	\$2 ½ @ 2 ¾
" 1 to 4 ½ x 1 ½ to 2.....	2 ½ @ 2 ¾
" ¾ to 1 x 1 ½ to 2.....	2 ½ @ 2 ¾
And Square.....	2 ½ @ 2 ¾
Hoop Iron, 1 ½ wide and upward.....	3 ¾ @ 3 ½
Band Iron, from 1 ½ to 4 in. wide.....	3 ¾ @ 3 ½
Horse-shoe Iron.....	3 ¾ @ 4 ½
Norway Nail Rod.....	6 ½ @ 6 ¾
Black Diamond Cast Steel.....	13 ½ @ 14 ½
Machinery Steel.....	9 @ 9 ½
Cast Spring Steel.....	8 @ 8 ½
Common Horse Nails.....	10 @ 14 ½
Perkins' Horse shoes ¾ keg of 100 lbs.....	\$4.75 @ 5.75
" Mule shoes.....	5.75 @ 6.75

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(From our Regular Correspondent.)

LONDON, ENG., July 4, 1881.

THE IRON MARKET

would appear to have undergone a slight change for the better during the past week, if we may trust some of the reports which are in circulation at the moment. The improvement has apparently had some influence upon a few of the crude iron-making districts, but in a general way it would seem to be chiefly confined to certain kinds of manufactured iron. In Scotland, for instance, warrants have not been quite so strong, consequent upon statements to the effect that the rumors circulated a week or

two ago as to the stoppage of certain of the Scotch furnaces were without foundation. It has even been asserted that the ironmasters are so well satisfied with the prices now prevailing that they contemplate the restarting of some of the furnaces now standing idle. I do not attach much weight to this rumor, especially as I note that some of the makers' brands have become a few pence dearer during the past week or 10 days. These gentlemen may be assumed to be pretty well posted in all that actively touches their own material interests, and the inference I draw from the facts now before me is that no additional furnaces are likely to be started at present. This is particularly likely to be the case in weather such as the present, when the home and foreign consumption of iron is certain to be minimized to a great extent. The course of the Cleveland iron market also affords evidence to the same end, pig iron in the North of England having become a trifle firmer since my last report. There is also the by no means insignificant circumstance of a steady growth of the reserve stocks, which are weekly attaining larger dimensions. To judge by the ordinary points which guide men of average common sense in business matters, one would arrive at the conclusion that a reduction of production, rather than an enlargement thereof, would be a wise and prudent course, yet, as we have seen in the recent past, such rules are not applicable to the iron trade, so that it would be merely begging the question to proceed on such lines of argument. The German ironmasters evidently believe in the virtue of regulating the output, seeing that they have just agreed to limit the make of pig iron throughout Westphalia and Rhineland to the extent of about 5000 tons monthly, or about 11 per cent. of the present average production during that period. What the Germans do, however, our smelters appear afraid to try, and probably will make no decided effort in that direction until one or more of their number shall have gone to the wall. As regards finished iron there is more strength in the open market than for some time past, and that notwithstanding the fact that we are at midsummer and near the end of the quarter. The Staffordshire 'Change meetings last week are stated to have been characterized by a somewhat better tone than for some time past, some of the merchants having given out orders of considerable size on export account. Bars of the quality known as "marked," or best iron, remain nominally unaltered at £7, but they are being sold 5/ @ 10/ below that price, and the various grades of bars down to common Welsh are to be had at every kind of quotation down to £5 per ton. For nail rods £5. 15/ @ £6 per ton is being asked and obtained; small rounds, £5. 17/6 @ £6. 5/; angles for bedsteads, £6 @ £6. 2/6; hoops and strips, £6. 5/ @ £7. There is a steady call for strips and hoops on United States account, and sheets are quite strong. Lattens are held at £9. 17/6, and galvanized kinds are decidedly dearer. The majority of the galvanizers are busy, and have two to four months' full work on their books. They are very firm in their views in consequence, and decline to book additional orders at the rates now current. Rails are without particular change. Blooms are in moderately good request for the United States, and old rails are in about medium demand.

SCOTCH PIG IRON

is in no sense stronger statistically considered, and, as a matter of fact, warrants are a few points weaker than at the date of my last week's report, although, on the other hand, some of the makers' brands are a shade better. There are good shipments, all things considered, but these, combined with the home consumption, are still very far from equal to the production, as is plainly shown by the circumstance that large quantities of pig continue to be sent into Connal's stores. In these warehouses there are now 567,155 tons—an addition of 1929 tons during the week—as against 443,464 tons a year ago, and 495,850 tons at Christmas last. The aggregated coastwise and foreign shipments this year to date have amounted to 263,189 tons—a decrease of 108,505 tons as compared with those up to the same date of 1880. On the other hand, the importations of Cleveland iron into Scotland have been 146,773 tons, an increase of 35,393 tons this year. The furnaces now blowing number 120 (including six making hematites) as against 116 this date 1880. Ballast pig is still 43/ per ton alongside ship. According to John E. Swan & Bros., the prices of the makers' brands are as follows:

Brands.	No. 1.	No. 2.	No. 3.	No. 4.
Gartshore.....	54/6	48/6	48/6	48/6
Coltness.....	50/6	48/6	48/6	48/6
Langloan.....	55/6	48/6	48/6	48/6
Shotts, Reseumer, Ordinary.....	55/6	48/6	48/6	48/6
Caldar.....	54/6	48/6	48/6	48/6
Summerlee.....	54/6	47/6	47/6	47/6
Chapelhall.....	54/6	47/6	47/6	47/6
Carnbroe.....	52/6	47/6	47/6	47/6
Clyde.....	49/6	46/6	46/6	46/6
Quarter-Clyde.....	49/6	46/6	46/6	46/6
Govan.....	47/6	46/6	46/6	46/6
Wishaw.....	47/6	46/6	46/6	46/6
Monkland.....	47/6	46/6	46/6	46/6
Warrants, 35 No. 1; 25 No. 3, G. M. B., f. o. b. Glasgow.....	46/10	46/10	46/10	46/10

AYRSHIRE BRANDS, FREE ALONGSIDE SHIP AT ABERDEEN.

Glenartnack.....	52/6	47/6	51/6
Ardeer.....	47/6	44/6	46/6
Ellington.....	47/6	44/6	46/6
Luigf.....	47/6	44/6	46/6
Muirkirk.....	47/6	44/6	46/6
Portland.....	47/6	44/6	46/6

EAST COAST BRANDS, FREE ALONGSIDE SHIP IN THE FORTH.

Carron, Selected.....	51/6	48/6	48/6
Carron, Ordinary.....	49/6	48/6	48/6
Almond, Export.....	52/6	48/6	48/6
Almond, Home use.....	49/6	46/6	46/6
Kinnell.....	47/6	45/6	45/6

CLEVELAND PIG IRON

has become a few pence stronger on the week, No. 3 having reached 37/ to 37½ per ton. The local engineering works, foundries, finished iron works, rolling mills, boiler and shipyards are for the most part well engaged, the shipbuilders being particularly busy. The steel works are also actively engaged. I do not possess very late information from the Eston establishment; were the contrary the

case, I might be sufficiently curious to ask how it comes about that they make such extraordinary scrap among their rail crops. I would also inquire how it comes about that such scrap contains broken rather than sawn-off rail ends! At the time of writing Cleveland pigs are net cash, f. o. b. in Tees:

No. 1 Foundry.....	41/3	Mottled.....	35/6
".....	39/3	White.....	35/3
".....	37/3	Refined Metal.....	52/6
".....	36/9	Kentledge.....	38/6
4 Forge.....	46/3		

WEST COAST HEMATITES.

On the West Coast of Cumberland and in the Furness district of North Lancashire a more cheerful tone is observable, notwithstanding the fact that the general inquiry for hematites has not largely improved, and in spite of the existence of reserve stocks at Barrow of at least 60,000 tons, besides other accumulations in the vicinity. There are 55 furnaces at work, making 25,000 to 27,000 tons (estimated) weekly, and 26 out of blast. Last week's shipments were 11,857 tons pig iron, and steel rails 9890 tons. Local ore is 11/6 to 13/6 per ton, and Spanish ore 16/ to 17/. The following prices for hematite pigs are for ordinary parcels:

	No. 1.	No. 2.	No. 3.
Cleator.....	62/6	61/6	60/6
Lonsdale.....	57/6	56/6	55/6
Worlington.....	57/6	56/6	55/6
West Cumberland.....	57/6	56/6	55/6
Lowther.....	57/6	56/6	55/6
Moss Bay.....	57/6	56/6	55/6
Distington.....	57/6	56/6	55/6
Harrington.....	57/6	56/6	55/6
Sowby.....	57/6	56/6	55/6
Maryport.....	57/6	56/6	55/6

UNITED STATES PURCHASES

in Europe would not seem to have entirely ceased, judging from the paragraphs which are currently appearing in our trade journals. From the Ironmonger of July 2d, for instance, I take several such items. One is to the effect that hoops and baling strips are going to your side from North and South Staffordshire. At Sheffield the crucible steel and principal cutlery houses are receiving their chief support from your market. From the Tees 1500 tons of Bessemer blooms were sent last week to Baltimore, as well as lots of steel rails to New York and Boston. From Barrow considerable parcels of mixed numbers of hematite pigs are going to New York, Boston and Philadelphia, and from the Clyde Bessemer blooms worth £10,000 were dispatched to Baltimore, with "more to follow." Several lots of ordinary Scotch and Cleveland pigs are also loading for United States ports. The Societe de Thy le Chateau, Belgium, has sold 2500 tons, and the Societe d'Acoz 1000 tons of 56 pounds steel rails to a London house for the United States market. Mr. Thomée, of Werdohl, Belgium, has received a large order for Bessemer steel wire rods at £8. 7/6 f. o. b. Antwerp, for September shipment to your market. The shipments to your side of the Atlantic from the ports of the British Channel (Cardiff, Newport, Swansea and Bristol), during the month of June included the following: Montreal—750 tons rails, 10,600 boxes of tinplates, 335 tons sheet iron, 82 tons sheet lead and 2 tons copper. St. Stephens, N. B.—400 tons rails. New York—1510 tons rails, 799 tons crop ends, 5079 tons blooms, 3341 bundles wire, 79,216 boxes tinplates, 624 tons spiegeleisen, 2000 pigs lead, 600 tons ingots tin, 12 cases yellow metal. Wilmington—983 tons rails. Baltimore—1000 tons rails, 776 tons crop ends and 600 tons tin. Philadelphia—350 tons spiegel. New Orleans—5134 tons rails. Galveston—5305 tons rails. The total of rails alone was thus 15,082 tons. According to Mr. W. Y. Edwards, of Cardiff, matters are cheerful as to freights to United States ports. He states: "During the month there has been a good demand for tonnage to the States ports, and rates advanced all round. The Southern ports continue to take rails in large quantities. Towards the close of the month, however, the shipments have been less, and, generally speaking, the requirements for tonnage in this direction are not so pressing. New Orleans has been firm at 14/6, and Galveston rates stand about the same figures as the previous month. Considerable firmness marks the engagements for Northern ports, particularly New York, in rails and blooms, and a material advance has to be recorded. Business has been doing freely at 12/6 @ 13/6, and at present there are indications of these rates being maintained. Shipments to Baltimore and Philadelphia have been light, but room is scarce and rates have stiffened. For July 14/ @ 15/ will probably rule."

AT SHEFFIELD

there is a fair amount of business in hand—indeed, I have private advice from friends in that town speaking quite hopefully as to the prospects of several branches in the near future. The "heavy" iron trades are well engaged. John Brown & Co. have large government orders for their Ellis compound armor plates, both for the English and French navies, and are very busy in the departments devoted to this class of work. Their other departments, as a rule, are not fully occupied. Charles Cammell & Co.'s armor-plate mills and shops are running double shift on the ordinary and the "Wilson" plates, for which excellent contracts are in course of being executed. I hear that this company are about to put down new and additional Bessemer plant close to their armor plate mills, and are believed to contemplate the use of that class of steel for pouring upon the iron plates, instead of Siemens steel. At Steel, Tozer & Hampton's a new engine for the rail mills has been put down, as well as new plant for the mills and saws, &c. The engine shaft runs the train (3 high) direct, at high speed, the engine being said to be by far the most powerful in this trade. The firm have also adopted the use of elongated ingot molds, whereby some "cogging" is saved, and the ingots made of just sufficient size for two flange or three double-head rails of ordinary weights and lengths. The electro-platers are busily engaged on replating for the Inman steamers and for some large hotels, and they, as well as other houses, are doing well on Australian account.

TIN PLATES

are still in a quiet condition, the market being mostly dull and without special features to note. The strike has collapsed, in a great measure, and there is little doubt that the works, as a whole, are making as large an aggregate output as at any previous period

in the history of the trade. As a consequence of this state of things, buyers have the upper hand and are enabled to make pretty much their own terms. Ordinary cokes may be quoted 15/ @ 15½ in London or Liverpool, and ordinary charcoals 18/ @ 19/, with special brands in proportion. The stocks held in Liverpool, Bristol, &c., are slightly less than a month ago, but the decrease is not of sufficient moment to affect the course of the market. The shipments made direct from Cardiff, &c., to your ports are gradually increasing, and probably will continue to do so, as that course saves the cost of carriage or freightage to Liverpool.

LATER AND IMPORTANT.

P. S.—Just as I close this letter the following telegraphic despatch has reached me: "The Cleveland ironmasters, at a meeting held this morning, passed a resolution to the effect that a reduction in the make of pig iron is desirable, considering the unfavorable nature of the returns for June, and it was resolved to ask the Scotch ironmasters to arrange a conference in order to co-operate with them in limiting the production!" This is a prompt and full vindication of my views, as persistently and plainly expressed in this and many former communications. The hot weather—95° in the shade to-day, 88° yesterday—is certain to stop many of the mills, foundries and other pig iron using establishments.

FOREIGN.

FRANCE.

(Moniteur des Interets Matériels.)
PARIS, July 1, 1881.—Metals.—Business has been moderately active at a general advance in prices; the outlook is encouraging in view of the generally prosperous condition of the country. We quote at the close: Copper, Chili Bars, 155.50 @ 157.50 francs the 100 kilos; Ingots and Slabs, 156.50 @ 158.50; Selected, 165, and pure Corocora Ore, 156.25. Tin—We quote Banca and English, 247.50, and all other sorts, 245. Lead may be quoted 37.50 @ 37.50. Spelter is now worth 42.50 @ 42.50. Iron.—The same extraordinary animation referred to in our last review still continues. Dealers find that their stocks are fast getting exhausted, and that the amounts sold are not easily replaced, rolling mills being loaded down with orders and thus only able to deliver tardily and irregularly. The rolling mills decline selling for less than 18.50 francs, Merchant Iron, delivered at Paris; if the dealer sells this at 19.50, the profit he makes barely suffices him. For imported 18.50 is asked. Old Rails sell at 15 francs, delivered at the forges. Steel works are jumping up like mushrooms in all directions: at Bayonne, on the Adour, at St. Nazaire, on the Loire, at Valenciennes in the North, and at Aire in the Pas-de-Calais. The works at St. Nazaire are hardly finished and we see buildings, &c., added for ship and bridge constructions. We hear even that the Compagnie Co. and Frederic Krupp, of Essen, intend erecting steel works at the mouth of the Adour, and blast furnaces, roll-mills and machine shops at Havre are spoken of. The Eastern France preparations are as great, the spirit of enterprise running high. Great steel works are being built at Longwy and Jeup. Between Longwy and Mont. St. Martin a blast furnace is springing up for working the Bois-du-Chât Iron Ore. The Saunoy works are building their third blast furnace. We hear that the Hussigny Co. intends erecting a number of new blast furnaces. All this is due to the continued favorable situation in the French Iron branch, to the abundance of orders in all departments thereof, and finally to the new processes for making steel, all of which has created a rage to go into this business. Coal.—Dealers are busy in laying in supplies, of which there are great arrivals both by water and rail.

BELGIUM.

(Revue Universelle.)
BRUSSELS, July 3, 1881.—Iron.—There is a steady run of trade. Several works have made large contracts, and they now ask an advance upon any further business. Merchant iron now commands 12 francs, with 1 franc difference between numbers. Sheet iron is slow in following the upward movement, for it still sells at 16.50. There is a good demand for, and tolerably large business doing in, Pig Iron. Affinage is selling at 18 francs, and Moulage is upheld. The general tendency in the iron market is a rising one, but Steel Rails are less firm. There is activity at the Structural Iron works, the bolt-making shops, as well as at the rolling mills capable of turning out specialties. We quote: Corners, 1

thru to move off well." *Metals*.—Lead is sustained at 15.25 @ 17.50. Copper is steady at 66 @ 75. Tin is firm at 100 @ 104. Spelter is inactive at 15.75 @ 16 marks per 50 kilos. *Coal*.—The transit of Westphalian Coal through Hamburg during the six months has been 233,400 tons, against 152,000 in 1880. We still hear that in the Moselle and Sarre region puddle pig iron has from 47 francs been reduced to 45; other iron unchanged. The Lorraine iron works have taken no steps yet about the projected steel works, waiting, as they say, for possible still further improvements in dephosphorization.

(Breslau Gazette.)

BRESLAU, July 4, 1881.—There is an improved feeling in the iron branch in Upper Silesia. The blast furnaces have sold their entire production for the third quarter. Merchant iron has not receded any further during the past fortnight. The rolling mills are all of them quite busy; they ask better prices and are less inclined to make any concessions. Considering the season the demand for coal is a comparatively active one. The Upper Silesian Railroad Co. has agreed to the new freight tariff on coal, which enables producers to ship it to Berlin and Stettin 3 marks per ton cheaper than hitherto—by water from here—and the government railroad administration has just confirmed this arrangement. The official statistics of Upper Silesia's mineral production in 1880 have just been published, from which it appears that the coal output has been 10,817,710 tons and that of iron ore 42,541 tons. Of coke pig 334,810 tons were produced, and of charcoal 1245 tons.

HOLLAND.

(Koch & Filterboom.)

ROTTERDAM, July 5, 1881.—Tin.—Holders ask 54.50 for Banca and 54.25 for Billiton, but would have to take 25¢ @ 50¢ less if they wanted to sell any.

STATISTICS END OF JUNE.

	1881.	1880.	1879.
Deliveries in June.....	13,529	11,793	15,207
since Jan. 1.....	78,550	68,340	66,532
Stock on warrants at Amsterdam.....	16,589	23,805	27,400
Stock on warrants at Rotterdam.....	11,160	17,654	22,310
Total.....	27,749	35,459	49,710
Ready for coming sales	70,167	31,158	40,493
Altogether.....	12,600	30,300	13,600
Total.....	110,516	76,917	103,812
Deliveries in June.....	10,502	14,935	11,108
since Jan. 1.....	55,480	55,395	47,759
Stock here and in Am- sterdam.....	55,584	57,667	63,480

CHILL.

(Weber & Co.)

VALPARAISO, May 12, 1881.—Copper.—The market opened with much firmness, but nevertheless, in spite of the decline in Exchange to 27¢, prices have not improved. Now there are less favorable advices from Europe, and finally Copper has given way to \$25.55 on board; even at \$20.25 there has been nobody to buy it on the spot. Sales since April 26, 12,048 quintals at \$20.25 @ \$20.87½. Nitrate.—Private cable dispatches from Europe report a better feeling there; prices have, therefore, been sustained despite the advancing freight market; toward the close producers even ask more. Sales 20,000 quintals at \$2.42½ @ \$2.45 for 95 and 95½. The charters have been 15,600 tons for Europe, and 1000 for the United States; the April shipments have been 15,000 tons to Europe and 500 to the United States, while there remained loading the 1st inst. 8660 tons for Europe and 2500 for the United States. The absence of a sufficient number of vessels will keep shipments light, probably, in May and June. Coal.—Most of late arrivals had been disposed of at 33¢ @ 34¢ on the coast; the few unsold cargoes arrived brought good prices; the demand being lively. Newcastle Steam sold at 43¢; Cardiff ditto, 30¢; and Swansea Smelting, 29¢. Available ship room, only 6000 tons. Exchange for 90 days' sight on London, 27½ @ 27¾.

Dust Explosions.

A report has been presented on the results of some experiments made with samples of dust collected at Seaham colliery, in compliance with the request of the British Home Secretary by Mr. F. A. Abel, F. R. S., President of the Institute of Chemistry and Chemist to the War Department: "The results of the experiments with Seaham and other dusts appear," says Mr. Abel, "to have demonstrated that coal dust in mines not only much promotes and extends explosive action in mines, by reason of the rapid inflammability of the finely divided combustible, and of the readiness with which it becomes and remains suspended in air currents, but that it may also be itself readily brought into operation as a fiercely burning agent which will carry flame rapidly as far as its mixture with air extends, and will operate even as an exploding agent, through the medium of a proportion of fire-damp in the air of the mine, the existence of which, in the absence of the dust, would not be attended by any danger. That dust in coal mines, quite apart from any inflammability which it may possess, can operate in a distinct manner as a finely divided solid in determining the ignition of mixtures of only small proportions of fire-damp and air, and consequently in developing explosive effects. That a particular dust in the mine may, therefore, be a source of danger, even though it contains only a small proportion of coal or combustible matter. Although the explosion which may occur through the agency of a non-combustible powder, in the manner described, may be of very mild or feeble character in the first instance, it may be almost at once increased in magnitude and violence by coal dust, which the first ignition will raise and bring into action. The proportion of fire-damp required to bring dust in a mine into operation as a rapidly burning or an exploding agent, even upon a small scale, and with the application of a small source of heat or flame, is below the smallest amount which can be detected in the air of a mine, even by the most experienced observer, with the means at present in use, as has been already demonstrated by the experiments of Mr. Galloway. Indeed, with dusts of highly sensitive or dangerous character, under those conditions, and very possibly with dusts not more so than the least sensitive of the Seaham samples, in the presence of a source of considerable heat and flame, such as a blown-out shot or an overcharged hole would constitute, a small proportion of fire-damp, the possible existence of which in the mine might not be in the least suspected, may serve as the inciting cause to the development of an explosion of coal dust. In the complete absence of fire-damp, coal dust exhibits some tendency to become inflamed when passing a very large lamp flame at a high velocity. If exposed to the action of a large volume of flame, such as is produced by the explosion of freely exposed gunpowder or gun-cotton, it exhibits, in addition, a decided tendency to carry or propagate flame. But, so far as can be determined by experi-

ments on a moderate scale, this tendency is of limited nature, and very different, indeed, from the property of carrying or propagating flame, which even comparatively non-sensitive dusts possess in the presence of a very small quantity of fire-damp. In conclusion, it may be admitted as possible that, with the large volume of flame and the great disturbing effect of a blown-out shot as the initiatory cause of the ignition of dust and its suspension in the surrounding air, such inflammation may, in the complete absence of fire-damp, be propagated to a greater distance than the results of small experiments would warrant one in assuming. But it can scarcely be maintained that the air of a mine in which the coal gives off gas at all can be at any time free from fire-damp; and as the existence of very small and unsuspected quantities of that gas in the air of a mine may suffice to bring about the ready propagation of flame by coal dust, and thus to develop violent explosive effects, it would appear needless to assume that coal dust may, in the entire absence of fire-damp, give rise to explosions, even of only limited character in coal mines, in order to account for casualties which cannot be ascribed to the existence of accumulations or sudden outbursts of fire-damp."

The Ansonia Clock Company's New Buildings.

The new factory of the Ansonia Clock Company in Brooklyn appears to be a better insurance risk than the old one. The ground now occupied by two large and two small buildings is 475 by 200 feet. The entrance is on Eighth avenue, and the works extend from Twelfth to Thirteenth streets and nearly to Ninth avenue. The largest building is the one fronting on Seventh avenue. It is perfectly square, being 200 feet on each side, and four stories in height. It is built of brick, and the mason work is very solid, the walls being about two feet thick. The new building stands exactly upon the site of the one that was burned, but it is only four stories in height, whereas the other factory had five. Fastened to the factory walls, inside the yard, are iron stairways and galleries, broad and substantial, leading to every floor upon each of the four sides of the building, so that if a fire occurred the factory could be emptied within three minutes. Iron shutters have been hung for all the windows, and very costly and complete precautions have been taken to guard against another fire. Upon each floor of the new building—that is, each floor on each side of the factory—there are two lengths of hose, each 100 feet long, which are all the time in position, and can be used at a quarter of a minute's notice. Besides these, there are throughout the different buildings 1500 automatic sprinklers, worked upon the thermostatic principle—that is, that if the temperature in any one place gets above a certain degree of heat, the expansion and contraction of certain metals at once starts the thermostatic machine, and the water is thus automatically released. These are designed for action in case a fire should break out at night when there is no one present to handle the hose; and there are so many of them, and the pressure of the water would be so great, that it would be almost an impossibility for a fire to get any sort of a headway. In addition to these precautions, the factory is covered by a large number of electric alarms as well, which when started not only give the location of the fire and send an alarm to the office, sounding it upon a gong, but also set the sprinklers in motion on whatever floor it may be started in. The wood finishing building is in the rear of the larger factory. It is also of brick, and built in the same style as the one described. It is five stories in height and 200 feet in length by 50 in breadth. There is an immense amount of delicate woodwork to be used, and it will be in this building where it will be manufactured and prepared. Then between these two large buildings is the finishing and varnishing shop, a three-story building, 80 by 50 feet in size, and the foundry building, which, like all other structures, is only one story in height. The wood-finishing, varnishing and foundry buildings are all new, and form a large addition to the building as it formerly existed.

Large Transfer of Property in Tennessee.—One of the most important trades in Southern property in years has just been concluded in Nashville, Tenn. The property of the Tennessee Coal and Railroad Company and Sewanee Furnace Company, covering a large body of land, including 15,000 acres of coal, and also 500 coke ovens, a blast furnace making 100 tons of iron daily, and a standard-gauge railroad of 21 miles, with 7 miles of branches—the cost of the improvements alone approximating \$2,000,000—was bought by a party of New York and Nashville capitalists. The price paid is not named. Mr. Nathaniel Baxter, Jr., president of the First National Bank of Nashville, has accepted the presidency of the company. Among the directors will be John H. Inman, of the firm of Inman, Swan & Co., New York; C. C. Baldwin, president of the Louisville, Nashville and Great Southern Railroad; ex-Governor J. D. Porter, president of the Nashville, Cincinnati and St. Louis Railway; E. W. Cole, president of the East Tennessee, Virginia and Georgia Railroad; C. M. McGhee, vice-president of the same company; Thomas O'Connor, of the firm of Cheery, O'Connor & Co.; Colonel A. S. Colyer, of Nashville; B. R. Smith, of New York, and James C. Warner, of the Rising Fawn Furnace Company.

The London Morning Post, in an editorial, directs attention to an article in the Quarterly Review intended to show from statistics that British manufactures are declining, and that foreigners are competing successfully, even in the English markets, in consequence of the system of free trade. The Post concludes as follows: "The Quarterly Review's array of facts deserves the most considerate attention of every man having the future prosperity of the country at heart. The United States, under the system of protection described by some of our political economists as suicidal, has paid during sixteen years over £150,000,000 of their debt, and paid £20,000,000 last

year under it. The United States have passed by leaps and bounds into a condition of prosperity which before long will enable them to cancel the enormous debt incurred on account of the civil war. England is by no means in the same hopeful condition. We grant that free trade has done much to benefit the country, but we doubt whether it has not been pressed too far; whether it has not become imperative that some resort to retaliatory duties shall be made in order to show that the advantages we offer to foreign states should be met by equivalent concessions on their part." The London Times says that the figures most prominently relied on in the Quarterly Review's article are altogether erroneous. The reviewer, it says, overstates the excess of imports over exports by £63,000,000, and it points out the fallacy of regarding the excess of imports as a sign of weakness. Even with an excess of imports amounting to £124,000,000, England is doing no more than getting an income on her investments. When the excess diminishes it is a sign that she is again investing largely abroad.

An Iron Observatory for Boston.

Abisha Miller, president of the Atlantic Iron Works, Boston, with several other gentlemen, have determined upon the erection in that city of an iron observatory, which, it is said, will be the highest structure in the country. The models, plans, &c., have all been completed, and its site partially agreed upon. The structure will be built of the best iron adapted for such a purpose, and its general appearance will be both ornamental and imposing, at the same time combining safety and comfort. The plans, however, have special reference to safety. The foundation will be sufficiently strong to support a structure weighing a thousand times more than will be the weight (260 tons) of the observatory, and the shaft itself will be cruciform in shape, with a "well" 3½ feet square in the center. The shaft will be secured by 16 galvanized guys, or steel-wire cables, each with the strength of 40 tons, the lower ends being anchored 10 feet in the earth, imbedded in stone and cement, and arranged in the form of an octagon.

The shaft will have two opposite angles and a car in each, and each car will be operated by independent engines. It is unnecessary to add that the device for operating the cars will be upon the most improved plan, and the machinery, steel wire cables, &c., connected with the same, will be such as to render an accident impossible.

About half way up the shaft there will be two galleries, in the opposite angles, each capable of accommodating 25 or 30 persons. These galleries will afford pleasure to visitors in various ways. Near the top there will also be two galleries, from which flights of steps will lead to a room 25 feet in diameter, filled with seats, and glasses for making observations, and guide-books will be at hand with which to assist the visitors in studying the country. This room will be large enough to accommodate several hundred people. Above this room there will be a lookout for those who may wish to go still higher. The first landing below, already mentioned, will be about half way up the structure.

The observatory will be 325 feet from the ground and 345 feet above sea level, and, although built upon a low spot of ground, it will be 68 feet higher than Bunker Hill Monument (from the sea level) and over 100 feet higher than the cupola of the State House, and also further from the ground than the dome of the Capitol at Washington.

The Missouri Iron Company.—The telegraph reports that the negotiations that have been in progress for the formation of a monster corporation at St. Louis, to include the prominent iron works and coal and ore mines of that vicinity, has been consummated. This consolidation is said to include the Iron Mountain Company, with a capital of \$3,000,000; Pilot Knob Iron Company, capital, \$1,500,000, both iron ore mines and blast furnaces; Grand Tower Manufacturing Company, capital, \$1,000,000; Vulcan Steel Works, capital, \$1,000,000; Choteau, Harrison & Valle Co., capital \$600,000; and the Jupiter Company, blast furnaces, capital \$400,000. This includes two of the largest and best iron ore mines of the country, the best coal mines near St. Louis, six blast furnaces, a Bessemer works and steel rail mill and an iron rolling mill. The company will be known as the Missouri Iron Company, with a capital of \$10,000,000. It is stated that Charles F. Choteau or Edwin Harrison, both of whom are very largely interested in the Iron Mountain Company and Vulcan Steel Works, will be president of the new company.

The Central and South American Telegraph Company being confirmed in all its rights and privileges, Mr. James Scrymgeour, the president, sailed for England in the last steamer to close a contract for 3000 miles of submarine cable, to be laid along the Pacific coast to Callao, there to connect with lines to Vera Cruz and the Argentine Republic.

The turbine wheel relied upon to open the valves of the enlarged Welland Canal locks are a failure, and will probably prevent the use of the canal this season. A previous report was that the gate timbers had been allowed to decay, through neglect of the contractor. For some reason the canal opening is unexpectedly delayed.

The largest grading plow ever constructed for any railroad company in this country will soon be delivered to the Chicago, Milwaukee and St. Paul Company. Its weight is 2500 pounds, the landside and share alone weighing 750 pounds. The mold board is 9 feet long, 26 inches wide and weighs 180 pounds; landside, 6 x 2 inches, and 9 feet long; share, 6 feet long, 15 inches wide and ½ inch thick; standard, 3 feet 8 inches long, 18 inches deep and 10 inches thick. The coulter weighs 200 pounds. The clevis is of thickly wrought iron and measures 5 feet in length. The plow is to be drawn by a locomotive running on a temporary track, and is calculated to handle more dirt than 2000

men could. It will be used by the construction forces on the extension of the Dakota and Hastings division of the road.

There is another long halt in the construction of the East River Bridge, for want of materials. We learn from the engineers that nearly all the steel, more than 5000 tons, has been delivered to the rolling mill and more than half, or about 3000 tons, has been rolled into the shapes required. As the bridge now appears there is a gap about midway across the river, where the floor beams are not laid, but enough beams are in position between the towers or on the approaches to completely span the river, if they were joined, 240 out of a total of 731 having been laid. The engineers remark that thus far in the erection of the work all calculations have been verified by the facts. The center span comprises about 45 per cent. of the whole superstructure.

Telegrams from Montana four weeks ago reported that Patrick Mulligan, a miner at Butte, was pierced through the body by a drill which fell several hundred feet upon him. He has now recovered. No other man in Montana can say that an 8-pound 2-foot inch drill ever passed through his body. Soon after the accident occurred, and when he first knew there was a possibility of saving his life, he expressed the somewhat superstitious belief that if the drill were polished and preserved he would ultimately recover. To gratify his humor, the boys at the mine have every day devoted a little time to the polishing of the drill, and it is now as bright and glistening as a new silver dollar, and Mulligan is well.

A stupendous work is being talked of by the Cleveland, Lake Superior and Iron Cliffs companies, of Ontonagon, Mich., which is the sinking of an enormous shaft on the corner forming the union of their different lands, and which, there is not the slightest doubt, according to the local newspapers, is underlaid with an immense ore bed. From this shaft the three companies would hoist their ore, saving the expense of sinking three different shafts on the property of each company. This talked-of shaft, if sunk, will surpass anything of the kind in the iron region of any country.

The New York Connecting Railroad and Warehouse Company has been organized, and \$2,000,000 capital paid in, with the object of taking possession of 150 acres of land on the New Jersey shore, between Bayonne and Greenville, whereon to build warehouses and concentrate railroad traffic so that ships can readily load or discharge. Contracts for building the docks have already been made.

The experiment of running a locomotive without brakes has just been successfully tried by the Delaware, Lackawanna and Western Railroad Company. The locomotive is of ordinary pattern, but has an extra pipe leading from the boiler to the steam chest, by which power can be applied against the piston, checking the engine, and enabling the engine to reverse without "hauling over."

According to a letter from Galveston to the New Orleans Democrat, a large portion of the iron intended for the Texas and Pacific Railway has been diverted to New Orleans, owing to the failure of vessels to comply with their charters providing for the unloading of 200 or 300 tons per day, which is rendered impossible, owing to insufficient wharf facilities.

The report of George M. Dallas, master of the Philadelphia and Reading Railway Company, in the matter of the Philadelphia and Reading Coal and Iron Company, states: "The balance in the treasury of the Coal and Iron Company on June 1 was \$84,211.35; the receipts during the month of May, including the balance on hand May 2, were \$1,269,303.38, and the payments, \$1,185,092.03.

A Franco-Atlantic Ocean Postal Company has been formed under the auspices of the Société Generale, with a capital of 5,000,000 francs. It has annual subsidies of 250,000 francs each from Canada and Brazil, and will receive a bounty of 500,000 francs under the recent French shipping law. It thus starts with a revenue of 1,000,000 francs.

M. de Saint Mortier, in a recent lecture before a Belgian engineers' society, states that the manufacturers of malleable-iron castings in Belgium use as much as 80 per cent of steel scrap in making them, and claim that it considerably improves their quality.

James S. Carew, of Norwich, Conn., died on Saturday, aged 60 years. He was treasurer of the Hayward Rubber Company and the Ashland Cotton Company, president of the Bacon Arms Company, had been Mayor of the city, and was at the time of his death a member of the Board of Water Commissioners.

The Board of Commissioners of the Cincinnati Industrial Exposition have issued, in a very handsome form, the rules and premium list of the exposition to be held from September 7 to October 6 in that city.

Investigations in Philadelphia thus far are adverse to placing electric telegraph wires in the sewers.

John Carver,
MANUFACTURER OF
CAULKING IRONS,
Cotton, Freight and Hay Hooks,
No. 44 North Third Street,
Near First.
BROOKLYN, E. D.

DAVID HYMES & CO.,
92 Church Street, New York,
JOB LOTS OF HARDWARE & CUTLERY.

NOTICE.

TO THE HARDWARE TRADE, Retail and Wholesale.

Before buying, send to me for quotations. Will give special figures lower than market rates on a large line of Shelf Hardware and Tinware.

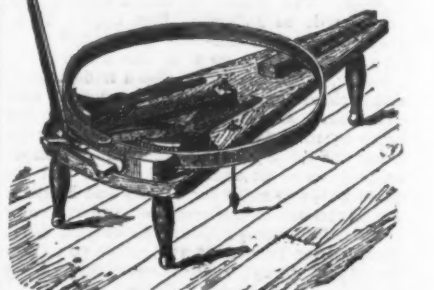
A. W. WHEELER,
141 Lake St., Chicago.

Wanted.

By a respectable young man, a position as Ship ping or Order Clerk, Packer or Porter, or in any capacity where he can be usefully employed. Is thoroughly posted in the General Hardware Business, and can furnish the best of references. Address: Office of The Iron Age, 81 Reade St., New York.

BLACKSMITHS, HARDWARE

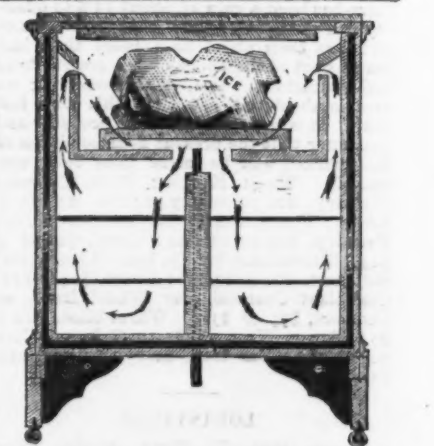
MEN AND AGENTS SHOULD READ THIS.



LITTLE GIANT WAGON TIRE UPSETTER.

This machine is strong, durable and cheap, and is superior to all others for upsetting or shrinking wagon tires, and bars of iron without cutting them. I will upset tires one inch at a heat, and is adapted to tires of any size or diameter. Every Blacksmith should have one; they are the best selling machines hardware merchants and agents ever handled. Price only \$25.00. Send for circular.

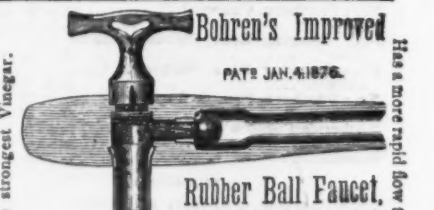
LITTLE GIANT MFG. CO.,
Millport, Chemung Co., N. Y.



GEORGE N. PIERCE,
BUFFALO, N. Y.,
Manufacturer of

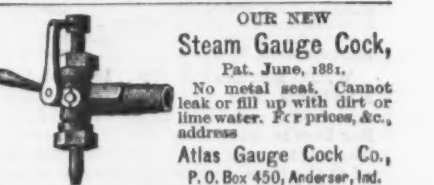
BIRD CAGES AND REFRIGERATORS.

Send for Illustrated Catalogue. Prices quoted upon application to BUTLER & DIEL, agents, at Syracuse, N. Y.; OPEN STOVE VENTILATING CO., 78 Beekman St., New York; or GEO. N. PIERCE, sole manufacturer, Buffalo, N. Y.



Bohren's Improved
PAT. JAN. 4, 1876.
Rubber Ball Faucet.
The best Wood and Metal Faucet yet made. Never leaks, splits or shrinks. Is as durable as the brass stop-cock and is much cheaper. It does not poison the liquids. It is especially adapted for Export, as it is not affected by shrinkage.

U. BOHREN & CO., Manufacturers,
239 West 25th Street, New York.
Send for Circular and Price List.



OUR NEW
Steam Gauge Cock,
Pat. June, 1881.
No metal seal. Cannot leak or fill up with dirt or lime water. For prices, &c., address
Atlas Gauge Cock Co.,
P. O. Box 450, Anderson, Ind.

HAMMOND'S
Window Springs
Lock and support upper and lower sashes—all sizes. Are very convenient, simple and durable. Sample to the Trade free.
W. S. HAMMOND,
Lewisberry, York Co., Pa.
Circulars give full instructions.

STEEL BRASS RUBBER STAMPS STENCIL PAINT
AM. MICHAEL, ALBANY, N.Y.

DRILL BRACE.



This is a 10-inch sweep Brace, with a gear-wheel speeded about three to one, to be used for drilling and also for boring in places where there is not room to revolve the Brace Sweep. By an ingenious device the large gear wheel can be put on at three different angles with the Brace Sweep, adapting it for use in narrow or cramped places. When not needed the gear wheel can be removed in one second, leaving a plain Brace. This Brace is made of steel, and is heavily nickel-plated, with rosewood handle and lignumvitae head. The jaws are of forged steel and will center and hold firmly Round Twist Drills from $\frac{1}{8}$ to $\frac{1}{2}$ of an inch in diameter. Also, Square Shank Bits and Drills of all sizes. Also, Square and Flat Screw Driver Bits. In fact, it will hold perfectly tool shanks of any size or shape. There is no other chuck in existence which will do this. It is our purpose to furnish everything in the line of Bit Braces and Breast and Hand Drills of a style and quality superior to anything else in the market.

Price of Drill Braces per dozen, \$36.

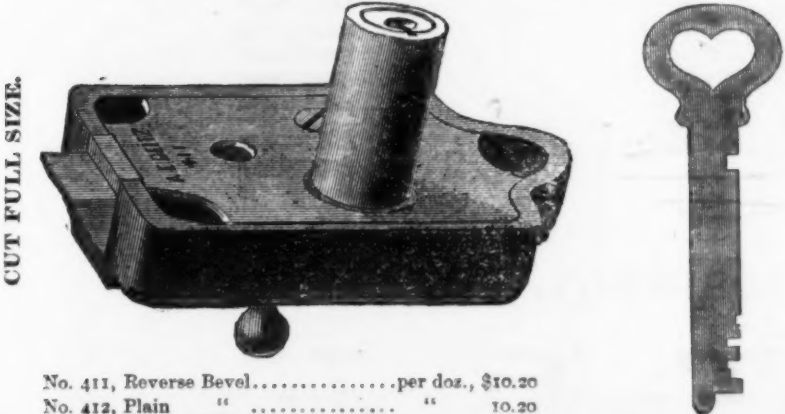
Same discount as Breast Drills.

MILLERS FALLS COMPANY,

74 Chambers Street, New York.

A. E. DEITZ, SCREEN DOOR LATCH,

For Screen Doors, Drawers, Cupboards.



No. 411, Reverse Bevel.....per doz., \$10.20
No. 412, Plain " " " " " " 10.20

Durrie & McCarty, Agents, 97 Chambers & 81 Reade Streets, NEW YORK.

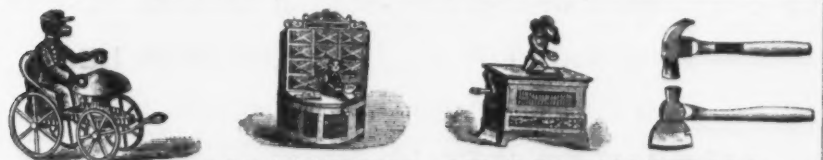
HEATON & DENCKLA HARDWARE CO.,
Hardware Commission Merchants,

507 Commerce Street, Philadelphia.

E. & G. BROOKE'S "Anchor Brand" Nails, Brads, Spikes, &c.
MALLORY, WHEELER & CO.'S Door and Pad Locks.
UNION MANUFACTURING CO.'S Butts.
AMERICAN SCREW CO.'S Screws.
D. R. BARTON TOOL CO.'S Edge Tools, &c.
FRANCE'S Shutter Holders.
Anti-Window Rattlers, Brass and Nickel-Plated.
WESTERN FILE CO.'S Cast-Steel Files.
AMERICAN SHEAR CO.'S Shears and Scissors.
HP NAIL COMPANY'S Wire, Steel, Iron and Brass Nails and Barbed Nails.
STEELE & SONS' Wrought Handle Sad Irons.

EXCELSIOR MILLS. Genuine Turkish Emery.
BROWN & BRO.'S Silver Plated Spoons and Forks.
GAYLORD MANUFACTURING CO.'S Tilt, Chest and Cupboard Locks.
AMES' Genuine Chester Emery.
COLWELL & COLLINS, NORWAY BOLT CO., Norway Carriage and Tire Bolts.
PLYMOUTH MILL CO.'S Black and Tinned Iron Rivets.
AMERICAN MACHINE CO.'S Putters, &c.
STUART PETERSON & CO.'S Tinned and Enamelled Ware, &c.

Also a large line of Heavy and Shelf Hardware.



VARIETY IRON WORKS.

KYSER & REX,

Manufacturers of
Hardware Specialties, Iron Toys, Novelties and Housefurnishing Hardware,
Main Office and Factory, Trenton Ave. and Margaretta St., Frankford, Philadelphia.
Branch Office, 19 & 21 S. 4th St., Phila. Hardware specialties manufactured to order.

MORSE TWIST DRILL AND MACHINE CO.

NEW BEDFORD, MASS., Sole Manufacturers of

Morse Patent Straight-Lip Increase Twist Drill,
Beach's Patent Self-Centering Chuck, Solid and Shell Reamers,
BIT STOCK DRILLS,

DRILLS FOR COES, WORCESTER, HUNTER AND OTHER HAND DRILL PRESSES. BEACH'S PATENT SELF-CENTERING CHUCKS, CENTER AND ADJUSTABLE DRILL CHUCKS, SOLID AND SHELL REAMERS
DRILL GRINDING MACHINES. TAPER REAMERS, MILLING CUTTERS AND SPECIAL TOOLS TO ORDER.

All Tools exact to Whitworth Standard Gauges.

GEO. B. STETSON, Supt.

EDWARD S. TABER, Treas.



PRIZE MEDALLISTS:

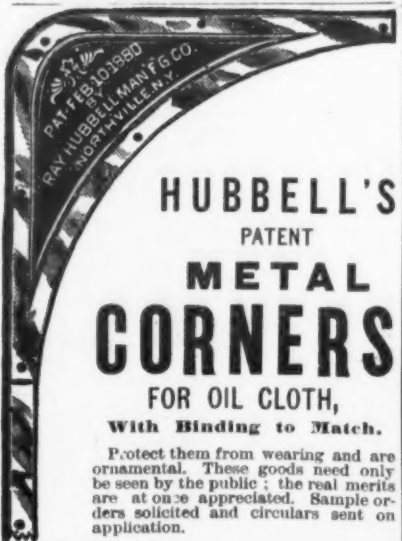
Exhibitions of 1876, 1880, 1883, 1884, 1885, 1886, 1887, 1888, and only award and medal for Noiseless Steel Shutters at Philadelphia, 1876; Paris, 1878, and Melbourne, 1881.

CLARK, BUNNETT & CO., LIMITED,

Late CLARK & COMPANY,
Original Inventors and Sole Patentees of
Noiseless Self-Coiling Revolving
STEEL SHUTTERS,
FIRE AND BURGLAR PROOF. ALSO IMPROVED
ROLLING WOOD SHUTTERS,
Of various kinds. And Patent
METALLIC VENETIAN BLINDS.

Endorsed by the
Leading Architects of the World.

Office and Manufactory,
162 & 164 West 27th St., N. Y.



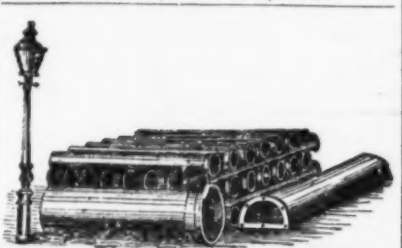
HUBBELL'S PATENT METAL CORNERS

FOR OIL CLOTH,
With Binding to Match.

Protect them from wearing and are ornamental. These goods need only be seen by the public; the real merits are at once appreciated. Sample orders solicited and circulars sent on application.

RAY HUBBELL,

Patentee and Sole Manuf'r in U. S. and Canada,
Northville, Fulton Co., N. Y.



R. D. WOOD & CO.,
Philadelphia,
Manufacturers of

Cast Iron Pipe

FOR WATER AND GAS,

Lamp Posts, Valves, &c.,
Mathew's Pat. Anti-Freezing Hydrants.
400 CHESTNUT STREET.

THE CLIMAX SASH CORD.

Patent Applied For.

A COILED STEEL WIRE CORD
for suspending all sizes of Window Sash, Gates, Doors and similar contrivances. Runs over any pulley.
More Simple, Durable and Economical than any in use.

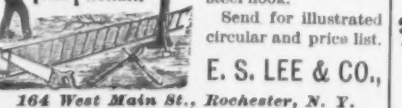
Send for explanatory circular and price list.
The Perpetual Tension Propelling Belt Co.,
Sole Manufacturers of
Gear's Patent Coiled Wire Belting,
Climax Sash Cord, and Perfect Door Springs,
328 & 330 7th Av., NEW YORK.



THE BEST IN THE WORLD.

Tree and Hedge Trimmer.

Unsurpassed for cheapness and durability. Unlike any other make, it combines a perfect lever principle with a blade working in a slotted steel hook.
Send for illustrated circular and price list.
E. S. LEE & CO.,
164 West Main St., Rochester, N. Y.



ZERO REFRIGERATOR,
with Water, Wine and Milk Cooler. Best Food and Ice Preserver in the world. Send for Book. A. M. LESLEY,
380 Sixth Avenue.
Also the Rotunda Furniture.

No. 35
 $\frac{3}{8} \times 1\frac{1}{2}$
BROWNING, SISUM & CO., 85 Chambers St.
Manufacture
Belt Hooks, Cutters, Spring Keys, D Rings, Staples, and everything pertaining to wire bending.
Factory, BROOKLYN.

L. COES' Genuine and Mechanics

PATENT Screw Wrenches

MANUFACTURED BY
L. COES & CO.,
Worcester, Mass.
ESTABLISHED IN 1830.



Our Genuine Wrenches are made with straight bars, full width and enlarged jaw, having ribs cast inside, which strengthen the jaw and give a full bearing on front of bar. These improvements, in combination with our new ferrule, made with double bearings, an iron tube, fitted to the shank and resting against the lower bearings, rigidly held in position by the handle and nut, effectually preventing back thrust of ferrule (see sectional view), verify our claim that we manufacture the heaviest and strongest Wrench in the market. None genuine unless stamped.

L. COES & CO.,
Worcester, Mass.
Warehouse,
97 Chambers and 81 Reade Sts., NEW YORK.
DURRIE & McCARTY,
Sole Agents.

The 1881 Pennsylvania Lawn Mower.

OUTSTRIPS ALL COMPETITORS. PREMIUMS TAKEN OVER ALL OTHER MOWERS.
EVERY MACHINE WARRANTED TO WORK AS REPRESENTED.



BY BUYING THE
PENNSYLVANIA LAWN MOWER,

YOU WILL
Save \$2 to \$3 each year in expense of Sharpening and other Repairs.
Can Cut Grass Immediately After Rain.

Make 10, 12, 14, 15, 16, 17, 18-inch Hand Mowers, and 30-inch Horse Lawn Mower. Both Hand and Horse Mower will cut higher grass than any other Mower manufactured.

Also Manufacture the
BEST 10-INCH FORWARD CUT LAWN MOWER in the MARKET, named "QUAKER CITY."

For descriptive catalogue and prices write
LLOYD, SUPPLEE & WALTON, Philadelphia.
DURRIE & McCARTY, New York.
AMES PLOW CO., Boston, Mass.
FRATT & CO., Buffalo, N. Y.
SIMMONS HARDWARE CO., St. Louis, Mo.
HAMILTON & MATHEWS, Rochester, N. Y.
HARKLEY, ALLEN & CO., Chicago, Ill.
H. MITHOFF & CO., Columbus, Ohio.
DUCHARME, FLETCHER & CO., Detroit, Mich.

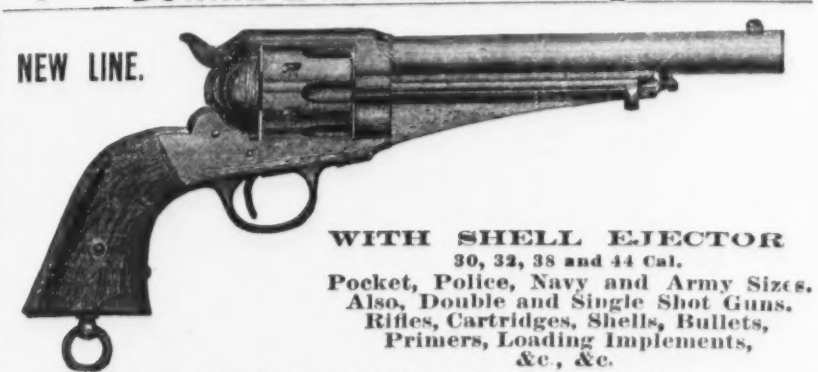
LOCKWOOD, VAN DOORN & TAYLOR, Cleveland, O.
ANDERSON HARDWARE CO., Indianapolis, Ind.
WM. FRANKFURTH & CO., Milwaukee, Wis.
G. W. ROUSE, Peoria, Ill.
LLOYD & CLARKE, La Crosse, Wis.
T. M. CLARKE & CO., Atlanta, Ga.
G. L. FARWELL, St. Paul, Minn.
L. C. DESSAINT & SONS, Davenport, Iowa.

CHAMPLAIN Forged Horse Nails.

MANUFACTURED BY THE
NATIONAL HORSE NAIL CO.,
Vergennes, Vermont.

HOT FORGED AND COLD HAMMERED POINTED. MADE OF BEST NORWAY IRON AND WARRANTED.

A full line of "CHAMPLAIN" and "NATIONAL" Nails always on hand at our Warehouse,
97 CHAMBERS AND 81 READE STREETS, NEW YORK.
DURRIE & McCARTY Sole Agents.



NEW LINE.
WITH SHELL EJECTOR
30, 32, 38 and 44 Cal.
Pocket, Police, Navy and Army Sizes.
Also, Double and Single Shot Guns,
Rifles, Cartridges, Shells, Bullets,
Primers, Loading Implements,
&c., &c.
Send for reduced catalogue and discounts of goods manufactured by
E. REMINGTON & SONS,
283 Broadway, NEW YORK.

MEDINA MANUFACTURING CO.

SAMSON & SWETT, Proprietors,
Medina, N. Y.,
Manufacturers of

The U. S. Wood Track, Champion, Anti-Friction and Check Back

BARN DOOR HANGINGS,
Rail, Stay Rollers, &c.

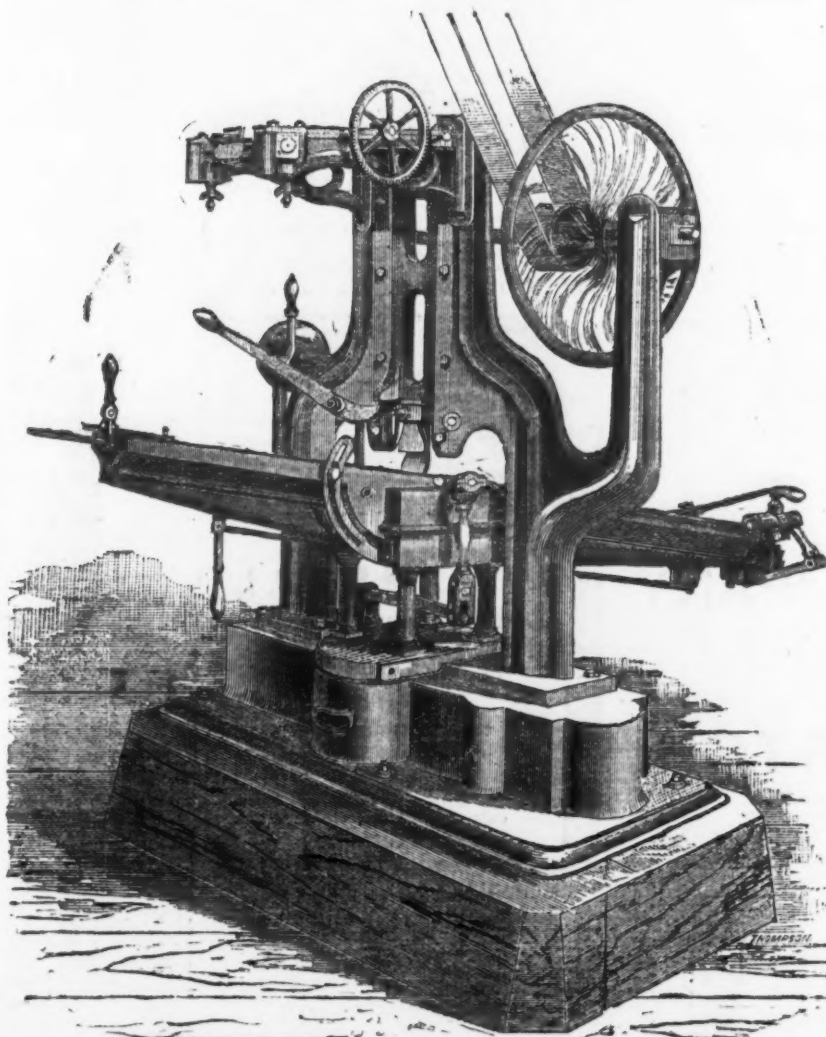
Send for price lists.
Can manufacture and introduce to the trade, on contract, royalty or otherwise, articles principally or wholly of gray iron castings.
Correspondence solicited.



NEW AMERICAN FILE CO.

SOLE OWNERS OF THE PATENT.

BERNOT'S PATENT



FILE CUTTING MACHINE

STEPHEN A. JENKS, President.

PAWTUCKET, R. I.

The American Fruit & Jelly Press.



Address,
American Fruit and Jelly Press Co.,
CINCINNATI, OHIO.

COBB & DREW

Plymouth, Mass.,

Manufacturers of Copper, Brass and Iron Rivets;
Common and Swedes Iron, Leathered, Carpet, Lace
and Gimp Tacks; Finishing, Hungarian, Trunk,
Clout and Cigar Box Nails, &c. Rivets made to
order.

NEW YORK AGENCY,
GRUNDY & DISOWAY,
HARDWARE,
165 GREENWICH STREET,
Agents for the Philadelphia Star Carriage and Tire Bolts.

MUCK BARS

Of Best Quality

FOR SALE.

Apply to

JUSTICE COX, JR. & CO.,

333 Walnut Street,
PHILADELPHIA.



Flanders' Improved Locomotive Cyl-
inder Boring Machine.

Bar and screw of cast steel, with two extra cutter
heads. Manufactured and for sale by the
L. B. FLANDERS MACHINE WORKS,
1025 Hamilton St., Philadelphia, Pa.

STAR LOCK WORKS.

ESTABLISHED 1836.

Trunk Locks,
Pad Locks,
Dead Latches,
Door Springs,
Trunk Stays,
Keys, &c., &c.
110 South 8th St., and Sansom, bet. 8th
and 9th, PHILADELPHIA.

PATENTED

Scand. Pad Locks
With Flat Keys.
Shackel secured to
the Lock Box.



HILLEBRAND & WOLF.

NEW MAKE OF MINE LAMP.



BOLSTER SPRINGS FOR FARM WAGONS.
Made of Best Oil Tempered Steel.
The ONLY RELIABLE Bolster Spring in Use.



SIMPLE AND
SATISFACTORY.
They save largely from wear and tear in every part of the
Wagon. They remove all necessity for a Spring Seat. They
convert a common Lumber Wagon into a Spring Wagon,
making it equally comfortable for from one to twenty persons.
They are admirably adapted to the wants of Fruit and Veget-
able Growers. They are suited to all makes and sizes of Farm
Wagons, and can be attached by any one. They make the
cheapest and easiest riding Spring Wagon in the market.
These Springs have been in practical use for over four years,
and are a pronounced success. No Teamster or Farmer can
afford to be without them. We want Agents everywhere.
Send for description and prices, and mention this paper.

SEMPLE & BIRGE MFG. CO., ST. LOUIS, MO.



TELESCOPE TUBES.
Fine Mandrel-drawn Tubes, from Brass or Ger-
man Silver. Tubes for sliding one within the other
made to order. Manufactured by ROBT. T. DEA
KIN & CO., 200 N. 12th St., Philadelphia, makers
of the American Improved Brass Garden Syring.

ESTABLISHED 1830.

FAIRBANKS

STANDARD SCALES.

Absolute Accuracy. Unvarying Accuracy. Sensi-
tive Action. Durability, are the necessity of a per-
fect Weighing Machine. All these requisites are
to be found only in

FAIRBANKS STANDARD SCALES.

They are made in every variety, adapted to all
uses, and

With Every Improvement
which the skill and experience of a half century
in the business can suggest.

Manufactured only by

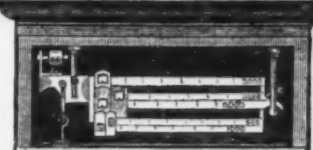
E. & T. FAIRBANKS & CO.,

St. Johnsbury, Vt.

FAIRBANKS & CO.,

311 Broadway, N. Y.

WEEKS SCALE WORKS.



Manufacturers of WEEKS' PATENT
COMBINATION BEAM SCALES,
569 Washington St., Buffalo, N. Y.
Price of 2-ton scale, platform 7 x 14 feet, \$55.00
Other sizes proportionately low in price.
EVERY SCALE WARRANTED ACCURATE AND DURABLE.
WEEKS & RAY, Pro'rs.

TINIUS OLSEN & CO.,
STANDARD SCALES

AND

TESTING MACHINES.

Manufacturers of Olsen's Little Giant Testing
Machine, and Improved Railroad, Wagon and Fur-
nace Charging Scales.

Office and Works, N. W. cor. 19th and
Buttonwood Sts., Philadelphia.

BUFFALO SCALE CO.,
BUFFALO, N. Y.,

Manufacturers of

R. R. Track Scales, Hay Scales, Coal
Scales, Grain Scales, Platform
Scales, Counter Scales, &c.

Send for price list, stating what you want

THOMAS MORTON,

Manufacturer of
CABLE, COPPER, IRON AND STEEL SASH CHAINS,
for suspending window shades. Also, Copper Cham-
pion Chains, with patent attachments, for same pur-
pose. Agents wanted in the principal cities in the
United States. Apply at
65 Elizabeth Street, New York.

UNITED STATES SMELTING WORKS,
MANUFACTURERS OF



BABBITT AND TYPE METALS,

Brass Castings and Solders of all Kinds.

PIG AND BAR TIN. PIG AND BAR LEAD.

Pig Brass and Copper, Spelter, Antimony, &c.

1615 & 1617 Spring Garden Street,

PHILADELPHIA.

GEORGE HUNT.

M. S. STOKES.



Elevator Scales.

RIEHLÉ BROS.

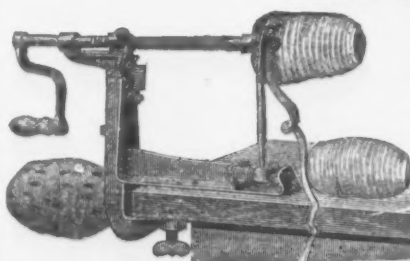
STANDARD

SCALES
AND
TESTING
MACHINES

PHILADELPHIA,
50 South 4th St.
NEW YORK,
115 Liberty Street.
PITTSBURGH,
Liberty St., cor. 7th av.
ST. LOUIS,
609 North Third St.
NEW ORLEANS,
142 Gravier Street.
CHICAGO,
167 Washington Street.

GOODSELL'S WHITE MOUNTAIN POTATO PARER.

Patent Applied For.



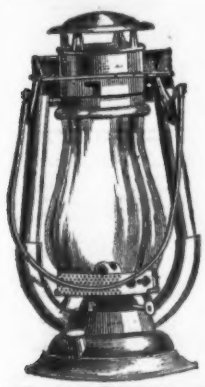
The White Mountain Potato Parer is the only
machine ever made that will not only pare a
potato much better than it can be done by hand,
taking off a thinner paring from every shape or
kind of potato, but will go into and clean out the
eyes, and altogether at a saving of at least 20 per
cent. It is free from the objections made to the
old style of rattletrap, geared parers; is solid and
substantial, cannot get out of order, and so cheap
as to be within the means of everybody.
Almost any of the Potato Parers in the market
seem as if they might do the work better "next
time," but the "White Mountain" DOES IT NOW.
Every Machine warranted as represented.

Price to the Trade, \$8 per dozen.

GOODSELL CO., Antrim, N. H., Sole Manuf'rs.

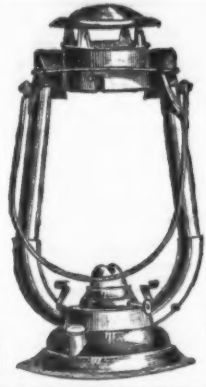
and Index to Advertisements.

GEORGE W. BRUCE,
1 Platt St., New York, Proprietor of the
Atlantic Screw Works,
And Agent for the
Florence Tack Co. and
C. A. Maynard.
Maynard's C. S. Planters',
Hilling and Bog Hoes;
Brady's Crown, Planting and
Hilling; Alwell's Weeding,
Planters' and Grub, and a
variety of other tools, for
Home and Export Trade.

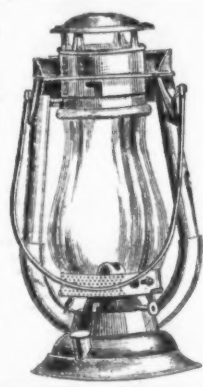


MILLER'S NO. 14 LANTERN

Gives more light and will hold the flame more perfectly than any other lantern made.



For Prices and Samples, address
Edw'd Miller & Co.,
Meriden, Conn.,
OR
35 Warren St.,
New York.



Manufacturers of
Lanterns,
Brass Kettles,
Machine Oilers,
Kerosene Goods,
Tinners' Trimmings,
&c., &c.



AKRON IRON COMPANY, AKRON, OHIO,

Sole Manufacturers of

Patent Hot Polished Shafting.

Medal of Superiority awarded at American Institute Fair of 1880.

This Shafting is superior to any in the market, and commends itself to the trade for the following reasons, viz:

- 1st. It is perfectly straight and round.
- 2d. It can be finished accurately to any desired gauge.
- 3d. It will not rust or tarnish easily.
- 4th. It will not warp or spring in key seating.
- 5th. Its surface is composed of magnetic oxide of iron, and consequently presents a journal or bearing surface that is unexcelled.
- 6th. The peculiarity of its manufacture is such as to entail loss in making it, if other than superior stock is used. Those purchasing it may therefore be assured of receiving first-class material.

Price lists, catalogues and references furnished on application.
Where parties desire it we cut keyways or splines any length required, at a moderate charge.

AKRON IRON CO., Akron, Ohio.

AGENTS:

E. P. BULLARD, 14 Dey Street, N. Y.
S. E. BLISS, 89 Lake Street, Chicago, Ill.
D. N. BROWN MACHINERY CO., St. Louis, Mo.
J. H. KERRICK & CO., Indianapolis, Ind.
JOSHUA HENDY, San Francisco, Cal.

TRENTON LOCK & HARDWARE CO., TRENTON, N. J.

MANUFACTURERS OF

DOOR LOCKS AND HARDWARE,

BRONZED IRON AND BRONZE METAL DOOR TRIMMINGS, BUTTS AND HARDWARE.

CAST BUTTS, DOOR BOLTS, WELL WHEELS, FLUSH BOLTS, SHUTTER BOLTS, PAD LOCKS,
BARN DOOR HANGERS, & RAIL, CRINDSTONE FIXTURES, SCREW & SIDE PULLEYS, NOISELESS PULLEYS, HAY FORK PULLEYS, SHELF BRACKETS,

PHILADELPHIA SLIDING DOOR HANGERS AND RAIL.

Having largely increased our facilities and line of goods, we invite the attention of the Trade.

Illustrated Catalogues Furnished on Application.

Agencies. { **James M. Vance & Co.**, No. 211 Market St., Philadelphia.
James Marshall, No. 48 Warren St., New York.

THE STANLEY WORKS, Wrought Iron Butts, Hinges AND DOOR BOLTS,

MANUFACTURERS OF

Plain, Japanned, Bronzed and Plated.

FACTORIES:

WAREHOUSE:

New Britain, Connecticut. 79 Chambers St., New York.

THE GLOBE MANUFACTURING CO., Successors to THE MIDDLETOWN TOOL CO.

Manufacturers of

HARDWARE,

INCLUDING IN GREAT VARIETY THE WELL-KNOWN

"Baldwin" Plane Irons.

(Every Iron of our make warranted a perfect cutter.) ALSO,
Galvanized Hammock or Boat Snaps and Gaff Topsail Self-mousing Ship Hooks, Harness Snaps, Baby Snaps, Washer Cutters, Pocket Wrenches, Amateur Lathes, &c.

Send for Catalogue and Discount Sheet.

MIDDLETOWN, CONN.

SABIN MFG. CO., MONTPELIER, VT., MANUFACTURERS OF

DOUBLE-ACTING SPRING BUTTS,

SABIN'S LEVER DOOR SPRINGS, For heavy doors,

BOSS AND CROWN SPRINGS, For light doors.

Send for Catalogue. Represented in New York by **DAVID HYMES & CO.**, 99 Church St.

GUN POWDER. Lafin & Rand Powder Co.

No. 99 Murray Street, New York,
Manufacture and sell the following celebrated brands of Sporting Powder known everywhere as

**ORANGE LIGHTNING,
ORANGE DUCKING,
ORANGE RIFLE**

more popular than any Powder now in use.
Blasting Powder and Electrical Blasting Apparatus.

Military Powder on hand and made to order.
SAFETY FUSE, FRICTIONAL & PLATINUM FUSES.

Pamphlets showing sizes of grain sent free.

"UNION" Door and Gate Spring.



SIMPLE, DURABLE AND ECONOMICAL.
The Objectable Features of Other Springs Entirely Overcome.

We Make Four Sizes, viz.:
No. 9, For Screen and Light Doors.
No. 8, For Medium Weight Doors and Gates.
No. 7, For Large Doors and Gates.
No. 6, For Store Doors and Extra Heavy Gates.

As there are several Springs similar in appearance, but without our improvements, upon the market, see that you buy only the "Union" Adjustable and Reversible.

MADE ONLY BY
**The Edwards Manufacturing Company,
DETROIT, MICH.**

JAMES COMLY,
4739 Paul Street, Frankford,
Philadelphia, Pa.
Manufacturer of
**Hardware Novelties,
GLASS CUTTERS, &c.**

VERMONT SNATH CO.,
Manufacturers of
Pat. Swing Socket Snaths
and also a large variety of other styles of Snaths
Springfield, Vermont.
Represented in New York by **Lamson & Goodnow Mfg. Co.**

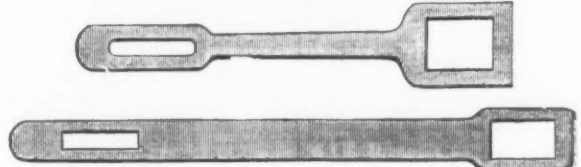
**THE PATENT
SCREW WINDOW BALANCE**
With which the Sashes work as with weights, their application being at an expense of one-half the cost of applied weights, no boxings being required. The Sashes are Locked with the meeting rail lock. Stands alone in its working. Price \$1 per set (four.) Discount to the trade. In use over three years. **Robt. B. Hugunin,** Sole Maker, Hartford, Ct., U. S. A.

**MACHINERY FOR
Straightening and Cutting Wire**
Of all Sizes to any Length.
Send for Catalogue.
JOHN ADT,
New Haven, Conn., U. S. A.

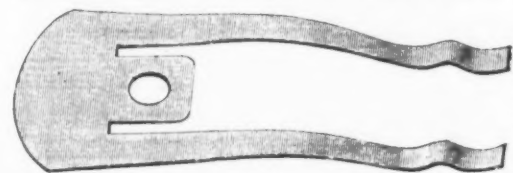
**T. NEW'S
PREPARED
ROOFING**
For steep or flat roofs. Applied by ordinary workmen at one-third the cost of tin. Circulars and samples free.
T. NEW, 39 John St., New York.
BARRETT, ARNOLD & KIMBALL, Western Agts., Chicago, Ill.

Providence Tool Co., PROVIDENCE, R. I.

STIRRUPS.



CLEARER SPRINGS.



Prices on Application.

HENRY B. NEWHALL, 105 Chambers St., NEW YORK AGENT.
J. H. WORK, 13 Pearl St., BOSTON AGENT.
S. H. & E. Y. MOORE, 163 & 165 Lake St., CHICAGO AGENT.

THE GENUINE STEBBINS MOLASSES & OIL GATES, MANUFACTURED ONLY BY **E. STEBBINS MFG. CO.** BRASS FOUNDERS AND FINISHERS.

Sole Manufacturers

Stebbins and Brightwood

COMPRESSION

AND

GROUND KEY WORK.

Send for circular and price list.

H. M. BREWSTER, Agent,
Brightwood P. O., Mass.

The Western trade can be supplied by
TREDWELL, COPPINS & CO., 130 Lake St., Chicago, Ill.

Office of **NELSON LYON**,
SOLE MANUFACTURER OF
**Lyon's Patent Metallic
Heel Stiffeners,
BRUSHES**
Of Every Description,
Nos. 17 & 19 Green St.,
Albany, N. Y., Dec. 3, 1880.

To All Whom it May Concern:

To-day a decree in my suit against G. T. Fisher & Co., of Detroit, for an infringement of my patent, was made and entered, of which the following is an extract:

At a session of the Circuit Court of the United States for the Eastern District of Michigan, held at Detroit, Mich., on Wednesday, the 8th day of December, 1880.

NELSON LYON against **GUYON T. FISHER, et al.**

It is ordered, adjudged and decreed, that the act entitled "An act for the relief of Nelson Lyon and Jeremiah S. James," passed by Congress and approved April 1, 1880, &c., is a good, valid and constitutional act.

That the original patent, bearing date July 9, 1872, and numbered 128,241, granted and issued to Joseph Baraloux, Jeremiah S. James and Nelson Lyon, when corrected by the Acting Commissioner of Patents, as directed by said act, was a good and valid patent.

That the said Joseph Baraloux was the original and first inventor of the improvements in metallic stiffeners for boots and shoes mentioned and described in said letters patent.

That the Reissued Letters Patent No. 918, dated May 11, 1880, granted to said Nelson Lyon for an improvement in metallic heel stiffeners for boots and shoes, originally patented as aforesaid, is a good and valid patent; that said Lyon is exclusively possessed of said Letters Patent and the invention thereby secured.

That the defendants, G. T. Fisher & Co., and each of them, have infringed upon the said patents and upon the exclusive rights of said Lyon under the same.

That said Lyon receive of said defendants all the profits, &c., they have made, and in addition thereto all the damage he has suffered by reason of the infringements by the defendants, and also the costs, charges and disbursements in the action.

It is also further ordered, adjudged and decreed, that a perpetual injunction be issued against said defendants, according to the prayer of the said complainant's bill.

You are also hereby notified that the perpetual injunction has been issued and served on the defendants.

All questions as to damages and settlements in relation to infringements under my patents must be addressed to and made with my attorney, **WILLIAM H. KING**, in my care at the above address.

NELSON LYON.

Wilson Bohannon,
Manufacturer of Patent

BRASS PAD LOCKS

For Railroad Switches, Freight Cars, and the Hardware Trade. All sizes, with Brass and Steel Keys.

Patent Horizontal Rim Cylinder Night Latch.

Self-adjusting to doors of any thickness, with Patent Stop and Drawer Back Knob.

PASSENGER CAR LOCKS, Bronzed, Nickel-Plated and Japanned.

127 Catalogues and Samples sent upon application.



[illegible]

[illegible]

Pine Colonies dia 25
 Peter's Petrol dia 20
 R. R. Shovels dia 25
 Remington's (Lowman's) Patent dia 25
 Rowland's dia 25
 Shovels and Tongs dia 25
 Iron and Brass Head, R. & E. list dia 25
 Square Steel new list dia 25
Slates.
 By case dia 75
 Less than a case dia 75
Spoke Shaves.
 Defiance dia 25
 Iron dia 25
 Wood dia 25
 Railing dia 25
 Stearns' dia 25
Spoke Trimmers.
 Boston's dia 25
 Stearns' dia 25
 Ives' dia 25
 Double dia 25
Spoons.
 Basting dia 25
 Riveted Table and Tea dia 25
 Britannia dia 25
 The Wm. covers Mr. Co. dia 25
 Hall & Elton dia 25
 Holmes, Booth & Hayden dia 25
 Cast Steel, Sil. Plates dia 25
 Tin (P. S. & W. Ives) dia 25
 Tin Cans (H. W. Co.) dia 25
Stocks and Dies.
 "Lighting" Screw Plate dia 25
Stones.
 Hamilton Hacker Stone dia 25
 Sand Stone dia 25
 Washita Stone dia 25
 Arkansas Stone No. 1, 4 to 6 in. dia 25
 Turkey Oil Stone, 1, 4 to 6 in. dia 25
 Lake Super. (Chase) dia 25
 Grindstones, Family, Loring's dia 25
Stove Polish.
 Joseph Dixon's dia 25
 Gold Media dia 25
 Mirror dia 25
 River Sun dia 25
 Dixon's Plumbago dia 25
Squares.
 Iron dia 25
 Nickel Plated dia 25
 Try Squares and Levels dia 25
 Waterbottom's Try and Mitre dia 25
Tacks, Brads, Etc.
 Tinned American dia 25
 Sweden Tacks, all kinds dia 25
 Swedish Patent dia 25
 Swedish Hungarian Nails dia 25
 American dia 25
 Finishing Nails dia 25
 Trunk and Clout Nails dia 25
 Basket Nails dia 25
 Brush Tacks dia 25
 American Cut Tacks dia 25
 Ougar Box Nails dia 25
 Pointed Tacks dia 25
Tape Borers.
 Common and Fine dia 25
 Ives' Tap Borer dia 25
Tape, Measuring.
 American dia 25
 Spring Tapes dia 25
Thermometers.
 Tinned dia 25
 Enterprise Mfg. Co. (Champion) dia 25
 Wood Bottom dia 25
 Nashua Lock Co.'s dia 25
 Wilson's dia 25
Toe Calks—Washed.
 No. 1 dia 25
Tuners' Tools and Machines.
 Machines dia 25
 Tools (P. S. & W.) dia 25
Transom Lifters.
 Wollenkamp's Patent dia 25
 Richer's Patent dia 25
Traps.
 Dams, Newhouse dia 25
 Onella Pattern dia 25
 Mouse, Wood, Choker dia 25
 Round Wire dia 25
 Catch-em-all dia 25
 Rat, "Decoy" dia 25
Trevels.
 Leonard's Brick and Plastering dia 25
 Reed's Brick and Plastering dia 25
 Danton's Brick and Plastering dia 25
 Clement & Maynard's dia 25
 Rose's Brick dia 25
 Worral's Brick and Plastering dia 25
Triers.
 Boring, Chess dia 25
Vices.
 Bold Iron List of July 1, '79 dia 25
 Crown dia 25
 Wilkinson's dia 25
 Parallel, Parker's dia 25
 Howard's dia 25
 Merrill's dia 25
 Trenton dia 25
 Backus and Union dia 25
 Double Screw Leg dia 25
 Pranklin dia 25
 "Family," List dia 25
 Saw Fliers, Bonney's dia 25
 Hopkins' dia 25
 Reading dia 25
 Richardson's Vise and Anvil dia 25
Washer Cutters.
 Smith's Patent dia 25
 John dia 25
 Penn's dia 25
 Washers—See Nuts and Washers dia 25
Well Wheels—Revised list.
Wire.
 Bright and Annealed List of June, 1880 dia 25
 Coppered dia 25
 Galvanized, No. 10 to 14 dia 25
 Time, No. 10 to 14 dia 25
 Cast Steel dia 25
 Annealed Fence, Nos. 8 and 9 dia 25
 Galvanized Telegraph, Nos. 7 to 9 dia 25
 Fence Staples dia 25
 Annealed Fence, No. 10 to 12 dia 25
 Annealed Fence, No. 13 to 14 dia 25
 American Adjustable dia 25
 Dismal dia 25
 Coe's Genuine dia 25
 Pattern, Malleable dia 25
 Girard standard dia 25
 Harris & Call's Patent Combination dia 25
 Merrick's Patent dia 25
 Van Wagener & Williams' Basin dia 25
 The Favorite Patent (bright) per doz. dia 25
 Webster's Pat. Combination dia 25
Univers, I. X.
 No. 1 dia 25
 No. 2 dia 25
 No. 3 dia 25
 No. 4 dia 25
 No. 5 dia 25
 No. 6 dia 25
 No. 7 dia 25
 No. 8 dia 25
 No. 9 dia 25
 No. 10 dia 25
 No. 11 dia 25
 No. 12 dia 25
 No. 13 dia 25
 No. 14 dia 25
 No. 15 dia 25
 No. 16 dia 25
 No. 17 dia 25
 No. 18 dia 25
 No. 19 dia 25
 No. 20 dia 25
 No. 21 dia 25
 No. 22 dia 25
 No. 23 dia 25
 No. 24 dia 25
 No. 25 dia 25
 No. 26 dia 25
 No. 27 dia 25
 No. 28 dia 25
 No. 29 dia 25
 No. 30 dia 25
 No. 31 dia 25
 No. 32 dia 25
 No. 33 dia 25
 No. 34 dia 25
 No. 35 dia 25
 No. 36 dia 25
 No. 37 dia 25
 No. 38 dia 25
 No. 39 dia 25
 No. 40 dia 25
 No. 41 dia 25
 No. 42 dia 25
 No. 43 dia 25
 No. 44 dia 25
 No. 45 dia 25
 No. 46 dia 25
 No. 47 dia 25
 No. 48 dia 25
 No. 49 dia 25
 No. 50 dia 25
 No. 51 dia 25
 No. 52 dia 25
 No. 53 dia 25
 No. 54 dia 25
 No. 55 dia 25
 No. 56 dia 25
 No. 57 dia 25
 No. 58 dia 25
 No. 59 dia 25
 No. 60 dia 25
 No. 61 dia 25
 No. 62 dia 25
 No. 63 dia 25
 No. 64 dia 25
 No. 65 dia 25
 No. 66 dia 25
 No. 67 dia 25
 No. 68 dia 25
 No. 69 dia 25
 No. 70 dia 25
 No. 71 dia 25
 No. 72 dia 25
 No. 73 dia 25
 No. 74 dia 25
 No. 75 dia 25
 No. 76 dia 25
 No. 77 dia 25
 No. 78 dia 25
 No. 79 dia 25
 No. 80 dia 25
 No. 81 dia 25
 No. 82 dia 25
 No. 83 dia 25
 No. 84 dia 25
 No. 85 dia 25
 No. 86 dia 25
 No. 87 dia 25
 No. 88 dia 25
 No. 89 dia 25
 No. 90 dia 25
 No. 91 dia 25
 No. 92 dia 25
 No. 93 dia 25
 No. 94 dia 25
 No. 95 dia 25
 No. 96 dia 25
 No. 97 dia 25
 No. 98 dia 25
 No. 99 dia 25
 No. 100 dia 25
 No. 101 dia 25
 No. 102 dia 25
 No. 103 dia 25
 No. 104 dia 25
 No. 105 dia 25
 No. 106 dia 25
 No. 107 dia 25
 No. 108 dia 25
 No. 109 dia 25
 No. 110 dia 25
 No. 111 dia 25
 No. 112 dia 25
 No. 113 dia 25
 No. 114 dia 25
 No. 115 dia 25
 No. 116 dia 25
 No. 117 dia 25
 No. 118 dia 25
 No. 119 dia 25
 No. 120 dia 25
 No. 121 dia 25
 No. 122 dia 25
 No. 123 dia 25
 No. 124 dia 25
 No. 125 dia 25
 No. 126 dia 25
 No. 127 dia 25
 No. 128 dia 25
 No. 129 dia 25
 No. 130 dia 25
 No. 131 dia 25
 No. 132 dia 25
 No. 133 dia 25
 No. 134 dia 25
 No. 135 dia 25
 No. 136 dia 25
 No. 137 dia 25
 No. 138 dia 25
 No. 139 dia 25
 No. 140 dia 25
 No. 141 dia 25
 No. 142 dia 25
 No. 143 dia 25
 No. 144 dia 25
 No. 145 dia 25
 No. 146 dia 25
 No. 147 dia 25
 No. 148 dia 25

BRASS AND COPPER TUBES,
WIRE SEAMLESS & REROLLING,
MERCHANT & CO. PHILADA.

NEW ENGLAND BUTT CO.,

Manufacturers of

Drilled Cast Butt Hinges

IN GREAT VARIETY.

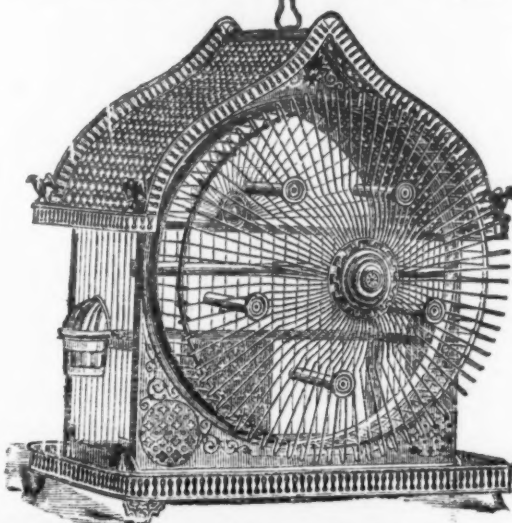
New England Gate Hinges.	Sad Irons, Polishing Irons.
Woolman's Self-Closing Gate Hinges.	Mrs. Cook's, McCoy's and New England Polishing Iron
Barn Door Hangers, Rolls & Rail.	Laundry and Tailors' Irons.
Sliding Door Rolls and Way.	Tailors' Box Irons.
Butterworth Window Springs.	Detachable Handle Sad Irons.
Grindstone Fixtures.	Waffle Irons.
Patent Saw Clamps.	Foot Scrapers.
Patent Floor Jacks.	Patent Foot Scraper and Cleaner.
Cistern Tops and Covers.	Braiding Machinery for Silk, Worsted
Stair Rail, Store and Fancy Brackets.	or Cotton, and for covering
Harness Hooks and Brackets.	Whips and Telephone Wire.
Flush Pulls, Small Anvils, Dumb Bells.	Fine Castings a specialty.

WORKS AT PROVIDENCE, R. I.

New York Office, - - - 99 Chambers Street.

BOSTON AGENTS-NASHUA LOCK CO.

Jewett's Revolving Perch Bird Cage, Patented



Nearly the whole front is a wheel with perches; the bird hopping from perch to perch gives motion to the wheel, joyous exercise to the bird, amusement and delight to the beholder. This cage is a genuine, useful and beautiful novelty. Dealers should place a bird inside the cage and place same in show window. Catalogue sent to dealers on application. Also, Manufacturers of the handsomest line of Bird Cages in the United States.

JOHN C. JEWETT & SONS, Buffalo, N. Y.



WM. A. CLARK'S
Patent Steakgreith.
Office, 96 Chambers, St., N. Y.

This article is designed to make Meat tender and prepare it for cooking. It does not pound the meat, but renders the toughest steaks and other meats tender all the way through. It has been in the market but a short time, and there are already nearly 20,000 in use.

C. E. JENNINGS & CO.,
PROPRIETORS.

RHODE ISLAND HORSE SHOE CO.,
 MANUFACTURERS OF

Horse, Mule & Snow Shoes of the Perkins Pattern.

Works at Valley Falls, R. I. Office, 31 Exchange Place, Providence, R. I.

F. W. CARPENTER, President. C. H. PERKINS, Gen'l Manager. R. W. COMSTOCK, Secretary

ADAM HEINZ. GEO. J. MUNSCHAUER. MICHAEL J. STARK.

NIAGARA STAMPING AND TOOL CO.,
 Manufacturers of

Presses, Dies and Tools for Working Sheet Metal.
FRUIT CAN AND TINNERS' TOOLS, &c.
 Works, 147 and 149 Elm Street, near Clinton St. **BUFFALO, N. Y.**

ENTERPRISE MFG. CO. of Pa.,

PATENTED HARDWARE MANUFACTURERS & IRON FOUNDERS,

THIRD and DAUPHIN STs., PHILADELPHIA.

New York Branch House with **DURRIE & McCARTY, 97 Chambers Street.**

INVALUABLE
IN THE HOUSEHOLD, STORE AND RESTAURANT
IN BAKING

Fruit Butters, Wines & 'Jellies.



Enterprise Combination Fruit Press.
Fruit Press, Price \$3.00. Drug Press, Price \$3.50.

TO THE DRUGGIST
IN BAKING
Decoctions, Infusions, Syrups, &c.

SPECIALTIES.

Enterprise Patent Cold Handle Double Pointed
SMOOTHING & POLISHING IRONS
CHAMPION TOBACCO CUTTERS,
PATENT MEASURING FAUCETS,
SELF-WEIGHING CHEESE KNIVES,
 &c., &c.

SPECIALTIES.

AMERICAN

COFFEE, SPICE & DRUG MILLS,
SAUSAGE STUFFERS,
FRUIT, LARD & JELLY PRESSES,
CHAMPION DRIED BEEF SHAVERS,
Bang-Hole Borers,
 &c., &c.

Steel.
WOLFF, KAHN & CO.,
MANUFACTURERS OF
Steel Wire

For All Purposes.
Special Finest CAST STEEL WIRE,
MARKET STEEL WIRE, PRIME COPPERED SPRING WIRE, TEMPERED AND UNTEMPERED STEEL WIRES, IN LONG LENGTHS, FOR CRINOLINE, CORSET, LOCK AND BRUSH MAKERS, AND ALL SPECIAL PURPOSES.

ALL KINDS OF FURNITURE SPRINGS.
IMPORTERS OF
IRON, STEEL, & RAILS
OF EVERY DESCRIPTION.
WIRE RODS, PLAIN AND GALVANIZED WIRES, &c.,
GUN BARRELS, MOULDS, AND ORDNANCE.

Shipments in bond from American Ports and direct from Europe to all parts of the World.
EXPORTERS AND GENERAL MERCHANTS.
WORKS, PEEKSKILL, N. Y.

Direct all communications to be
OFFICE & WAREHOUSE, 93 John St., New York.

MILLER, METCALF & PARKIN,
Pittsburgh, Pa.,
Manufacturers of
CRESCENT STEEL,

In Bars, Sheets, Cold-Rolled Strips, &c.
Polished, Compressed Drill Rods and Wire.
Warranted equal to any imported in quality, finish and accuracy.
Also Common Grades.

Established 1810.
J. & RILEY CARR,
SHEFFIELD, ENGLAND.
Manufacturers of the "Celebrated"
"DOG BRAND" FILES.
Also of superior
STEEL
For Drills, Cold Chisels, Tools, Taps, Dies, &c.
COLD ROLLED STEEL for Clock Springs, Corsets, &c.
SHEET CAST STEEL for Springs, Saws, Welding and Stamping Cold, &c.
GERMAN, MACHINERY, ENGLISH AND SWEDISH SPRING STEEL,
And all other descriptions for machinists and agricultural purposes.
Warehouse, 30 Gold Street, New York.
Near John Street. HENRY MOORE, Agent.

S. & C. WARDLOW,
Sheffield, England,
Manufacturers of the Celebrated
Cast and Double Shear STEEL.
In Bars, Sheets and Coils, for fine Pen and Pocket Cutlery, Table Knives,
Mining Tools, Dies, Files, Clock and other Springs, and Tools of every variety.
Warehouse, 95 John Street, New York.
WILLIAM BROWN, Representative.

Cleveland Rolling Mill Co.,
Manufacturers of
BESSEMER STEEL
AND
Iron Rail and Fastenings,
SPRING STEEL
AND
WIRE OF ALL KINDS,
Tire, Axles and other Forgings,
Steel Plate, Galvanized and Black Sheet Iron, Corrugated Roofing and
Siding of Siemens-Martin, Bessemer Steel and Iron.
CLEVELAND, OHIO.
Western Agency, New England Agency,
91 Lake Street, Chicago. 239 Franklin Street, Boston.
N. D. PRATT, Agent. JOHN WALES & CO., Agents.

THE MIDVALE STEEL CO.,
NICETOWN, PHILADELPHIA.

Best Warranted Cast Steel for Machinists' Tools,
Taps, Dies, Punches, Shear Blades, Chipping Chisels and Granite Rock Drills,
Extra Mild Center Steel, special for Taps,
MACHINERY AND CAST SPRING STEEL, HEAVY AND LIGHT FORGINGS.
Warehouse, No. 12 North 5th St., Philadelphia.
Address A. M. F. Watson, General Sales Agent.

STEEL Gautier Steel.
See Page 3.

Steel.
NEWARK STEEL WORKS.
BENJAMIN ATHA & CO.,
Manufacturers of
BEST REFINED CAST STEEL

And grades of Steel specially adapted for Lathe Tools, Chisels and Taps and Dies.
Warranted most superior for TOOLS AND GRANITE ROCK DRILLS
A full assortment of this universally approved OLD BRAND and other Steels for sale by
EDWARD FRITH & SON, Agents,
No. 241 Pearl St., New York.

LABELLE STEEL WORKS.
SMITH, SUTTON & CO.,
MANUFACTURERS OF ALL KINDS OF
STEEL.

Also Springs, Axles, Bake Teeth, &c.
OFFICE & WORKS, Ridge, Lighthill & Belmont Sts., & Ohio River, Allegheny.
Post Office Address, Pittsburgh, Pa.
Represented at Boston by WETHERELL BROS., 31 Oliver St.; at Milwaukee by JOHN PRITZLAFF, 43 to 45 West
Water St.; at Chicago by S. D. KIMBARK, 86 to 88 Michigan Ave.

ALBANY & RENSSLAER IRON & STEEL CO.,
Troy, N. Y.,
Office in New York City, 55 Broadway,
MANUFACTURERS OF

BESSEMER STEEL RAILS,
Machinery Steel, Merchant and Ship Iron.
HORSE SHOES.
SAM'L G. B. COOK & CO., Agents for Southern States,
67 and 69 German Street, Baltimore, Md.

FRANCIS HOBSON & SON
97 John Street, NEW YORK
Sole Manufact'rs of "CHOICE" Extra Cast Steel.
Manufacturers of all Descriptions of Steel.
Manufacturers of Every Kind of Steel Wire.
Don Works, Sheffield, England.
CHAS. HUGILL, Agent.

THE
STEEL COMPANY OF SCOTLAND, LIMITED,
(SIEMENS' PROCESS),
MANUFACTURERS OF

Steel Rails, Steel Ship Plates,
Steel Blooms for Rails, Steel Boiler Plates,
Steel Blooms for Wire, Steel Angles,
Steel Wire Rods, Steel Forgings,
Steel Locomotive Fire Boxes, Steel Castings.
JAMES LEE & CO.,
Resident Agents for the United States,
72 Pine Street, New York.

GEO. SANDERSON & CO.,
MANUFACTURERS AND

Importers of **STEEL,**
Removed to 30 Gold Street, New York.

Particular attention is paid to quality and temper for FILES, SAWS, EDGE TOOLS,
FABLE and POCKET CUTLERY, TOOLS, TAPS and DIES; also for COLD ROLLED STEEL for
CLOCK SPRINGS, CORSET CLASPS, &c.

A Large Assorted Stock of JOHN ROTHERY'S FILES always on hand.
Warranted Superior to any Steel in the Market, either
English or American, for every purpose.

Also,
Combination Chrome Steel and Iron for
Safes, Jails and Deposit Vaults.
Send for Circular
and
Price List.

Chrome Steel Works,
Kent Avenue and Keap Street,
BROOKLYN, E. D., N. Y.

Chicago Branch,
121 Lake Street,
MALCOLM McDOWELL, Manager.
Cincinnati Branch,
123 Central Avenue,
GEORGE KINSEY, Manager.

JOLIET STEEL COMPANY,
MANUFACTURERS OF
Steel Rails,
ALL WEIGHTS.

The Company warrant its Rails equal in quality to any manufactured in the
United States.

ALEX. J. LEITH, President.
W. R. STIRLING, Treasurer.
C. E. SARGENT, Secretary.
CHICAGO.
Office, Rooms D and E, Honore Building.

H. S. SMITH, General Sup't.
JOLIET.
Works, Joliet, Ill.

Steel.
R. MUSHET'S
Special Steel

FOR
LATHES, PLANERS, &c.
Turns out at least double work by increased speed
and less waste, and cuts harder metals than any other
steel. Neither hardening nor tempering required.
Sole Makers,

SAMUEL OSBORN & CO.,
Sheffield, England.
Represented in the United States by
B. M. JONES & CO.,
Nos. 11 & 13 Oliver Street, BOSTON.

NAYLOR & CO.,
99 John St., New York. 6 Oliver St., Boston, Mass.
W. R. HART, Agent,
205 S. Fourth St., Philadelphia, Pa.
THOS. J. HOYT, Agent,
709 North Second St., St. Louis, Mo.

MANUFACTURERS OF
STEEL COMPRESSED SHAFING,
"Benzon" Homogeneous Plates
For Boilers, Fire-boxes, &c.

Axles, Crank Pins, Spring Steel,
And all other kinds of
Martin-Siemens Steel and Iron
For Railroad purposes, &c.

IMPORTERS OF
IRON AND STEEL RAILS,
SWEDISH IRON,
Tin and Terne Plates and Metals.

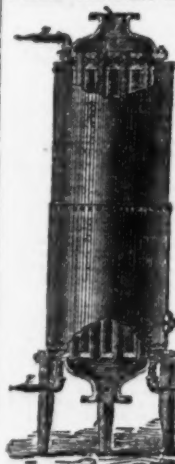
H. & A. CARTER,
1a Laurence Pountney Hill,
Cannon Street, London, E. C.

Iron and Steel Merchants,
Exporters of Iron and Steel Rails, Blooms, Spie-
geleisen, Pig Iron, Cast Iron, Old Rails and Scrap,
Iron Ore, &c. Sole agents for the sale of the Vona
Dulce (Somorostro) Iron Ore from the Magdalena
Mine. Shipping Port: Bilbao.

Analysis of "Magdalena" Ore.
Silica..... 4.05
Peroxide of Iron..... 84.60
Oxide of Manganese..... 1.05
Alumina..... 1.24
Lime..... 0.33
Magnesia..... 0.04
Phosphoric Acid..... 0.04
Sulphuric Acid..... 0.04
Combined Water..... 5.97
Moisture..... 2.43
100.43

Metallic Iron..... 50.72
The Sulphuric Acid exists as Sulphate of Lime
and is, in my opinion, not detrimental.
Signed, E. D. RILEY, F. C. S.
Cable address:
HENRY CARTER, London.

THE LOWE PATENT
FEED WATER HEATER & PURIFIER.



FOR
Heating and Puri-
fying Water for
Steam Boilers.
Patented July 12, 1877.
Has Straight
Tubes.
SIMPLICITY,
RELIABILITY and
EFFICIENCY
At Less Cost
Than any other.
Write for prices and
further information to
the manufacturers,
Lowe & Watson,
BRIDGEPORT, CONN.

A. PARDEE, Hazelton, Pa. J. G. FELL, Phila.

A. PARDEE & CO.,
237 South Third St.,
PHILADELPHIA,
No. 111 Broadway, New York.

MINERS AND SHIPPERS OF
Lehigh Coals.

The following superior and well-known Lehigh
Coals are mined by ourselves and firms connected
with us, viz.

A. Pardee & Co. {HAZLETON,
CRANBURY,
SUGAR LOAF.
Pardee, Bro. & Co. LATTIMER.
Calvin Pardee & Co. HOLLYWOOD
Pardee, Sons & Co. MT. PLEASANT.

EMPIRE STATE MFG. CO.
BUFFALO, N. Y.



Copper,
Half Copper,
Nickel Plated
TEA KETTLES.
Metal Spinning.

Steel.

CARNEGIE BROS. & CO., LIMITED,
THOS. M. CARNEGIE, Chairman. PITTSBURGH, PA. D. A. STEWART, Treasurer.

EDGAR THOMSON STEEL WORKS DEPARTMENT.

Works at Bessemer Station, P. R. R.

Branch Office and P. O. Address, 48 Fifth Ave.,
MANUFACTURERS OF



OF SUPERIOR QUALITY.

Union Iron Mills Department

Mills at Thirty-third St. and A. V. R. R.

Branch Office and P. O. Address, Thirty-third St.
MANUFACTURERS OF

STRUCTURAL IRON.

Bridge Iron, Iron Beams, Channel Bars, Car Truck Channels, Angles, Tees,
Universal Mill Plates, Bar Iron, Light Steel and Iron Rails.

Special attention given Unusual Shapes and Sizes.

Lithographs of sections and book of detailed information giving calculation of strain, &c., furnished
to Engineers and Architects on application.

NEW YORK OFFICE: Room 32, No. 55 Broadway, N. Y.

NORTH CHICAGO ROLLING MILL CO.

ESTABLISHED 1857. CAPITAL, \$3,000,000. INCORPORATED 1860.
Works at Chicago, Ill., and Milwaukee, Wis.

MANUFACTURERS OF

**MERCHANT BAR, FISH PLATES, PIG METAL,
IRON RAILS & BESSEMER STEEL RAILS.**

Present Annual Capacity of these Works.	Fish Plates.....	13,000 tons
	Merchant Bar.....	40,000 "
	Pig Metal.....	120,000 "
	Iron Rails.....	110,000 "
	Steel Rails.....	100,000 "
	Total Capacity per year.....	483,000 "

OFFICES

17 Metropolitan Block, Chicago, Ill.
37 Mitchell Block, Milwaukee, Wis.

O. W. POTTER, President, Chicago.
N. THAYER, Jr., Vice-President, Boston.
S. CLEMENT, Treasurer, Milwaukee.
R. C. HANNAH, Secretary, Chicago.

THE MONTGOMERY IRON & STEEL COMPANY.

WORKS AT DANVILLE, PA.

PIG IRON, T AND STREET RAILS.

A general assortment of mine and narrow gauge rails kept on hand, from which shipments can be
made promptly.

W. E. C. COXE, President, Reading, Pa. F. P. HOWE, Gen'l Sup't, Danville, Pa. S. W. INGERSOLL, Treasurer, 227 South Fourth St., Philadelphia, Pa.

THE SIEMENS-ANDERSON STEEL CO.,

Successors to ANDERSON & CO.,
Manufacturers of

Crucible Tool, Cast Spring, Cast Plow, Iron Centre,
Soft Centre, and Iron Back Plow, also Open Hearth
Spring, Tire, Plow, Machinery, and

ALL DESCRIPTIONS OF STEEL.

And Sole Proprietors of the Siemens Direct Process in the United States.

President, THOS. T. FLAGLER, of the Holly Manufacturing Co., Lockport, N. Y. Treasurer, L. M.
LAWSON, of Donnell, Lawson & Simpson, New York. Asst. Treasurer, S. A. COSGRAVE, Pittsburg.
Pa. Secretary, C. G. HILDRETH, New York. Vice President and General Manager, ROBT. J. ANDER-
SON, Pittsburgh. Attorneys, Messrs. ARTHUR, KNEVALS & RANSOM, New York.

**BLACK LEAD
STOPPERS**

FOR

Bessemer Converters and
Siemens-Martin Furnace
Ladles.

All the regular sizes in
stock, with nozzles to fit
each size. Special sizes or
shapes made to order from
sample or drawing.



CRUCIBLES

FOR

German Silver, Brass and
Steel.

Jewelers' Crucibles,

Covers, Dips, &c.

FILE HARDENERS.

W. T. MACFARLANE,
Treasurer and Agent.

ELBA IRON & BOLT CO., Limited.

MANUFACTURERS OF

MERCHANT BAR IRON,

Skelp Iron, Splice Bars, Railway Track Bolts, Car, Bridge,
and Machinery Bolts, Nuts, &c.

We invite the attention of RAILROAD MEN especially to our make of SPLICE BARS and Track
bolts. Using the best brands of REFINED IRON, and paying close attention to the finish of our
manufactures, we are enabled to offer our patrons BOLTS, NUTS, SPLICE BARS, &c., of excellent
quality. Our works have been enlarged within a few years; all orders are now executed with prompt-
ness; all our work guaranteed.

SEND FOR PRICE LISTS AND INFORMATION TO

ELBA IRON & BOLT CO., Limited, Pittsburgh, Pa.

BELLAIRE NAIL WORKS,

PIG IRON AND NAILS,

Manufacture the Celebrated Brand of

BELLAIRE NAILS,

Office and Works, **Bellaire, Ohio.**

THE STANDARD WOOD TRACK HANGER OF AMERICA.

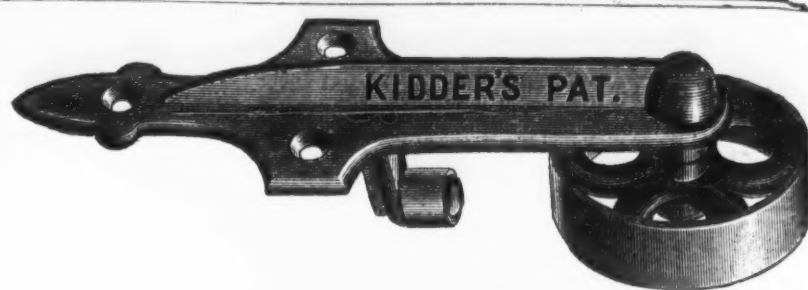
For Sale by the Wholesale Trade

Generally, or the

KIDDER SLIDE DOOR HANGER CO.,

Sole Manufacturers,

ROMEO, MICHIGAN.



THE

"KIDDER."

WM. A. CLARK'S PATENT EXPANSIVE BITS WITH TWO CUTTERS EACH,

Small Bit Boring from 1/2 in. to 1 1/2 in.; Large Bit Boring from 3/4 in. to 3 in. Warranted.

Made of Jessop's Cast Steel, and Parts Interchangeable.



Manufactured by

R. H. BROWN & CO., Westville, Conn., Successors to W. A. CLARK.

ESTABLISHED IN 1859.



PUBLISHED EVERY SATURDAY.

THE OLDEST AND CHIEF REPRESENTATIVE OF THE IRON, HARDWARE AND METAL TRADES.

OFFICE: 44a CANNON STREET, LONDON, E. C.

ADVERTISEMENTS AND SUBSCRIPTIONS ARE RECEIVED AT THE VARIOUS OFFICES OF "THE IRON AGE," NAMELY:

NEW YORK OFFICE: DAVID WILLIAMS, Publisher of *The Iron Age*, 83 Reade street, who will, on receipt of application, supply
specimen copies free.

PITTSBURGH OFFICE: 77 Fourth Avenue—JOS. D. WEEKS,
Manager and Associate Editor.

PHILADELPHIA OFFICE: 220 South Fourth Street—THOMAS
HOBSON, Manager.

CINCINNATI OFFICE: Builders' Exchange—T. T. MOORE,
Manager.

SOUTHERN OFFICE: Cor. Eighth and Market Streets, Chatta-
nooga, Tenn.—S. B. LOWE, Manager.

SPECIAL FEATURES.

Notes of Novelties.—This is a department of the journal always watched with interest by the trade, as it contains an account, from week to
week, of the novelties which manufacturers and inventors are introducing to the notice of the trade. These articles are freely illustrated.
Special Correspondents.—The *Ironmonger* has a deserved reputation for its special correspondence from all the principal Continental, British
and manufacturing centers. The writers are gentlemen holding important positions in the districts with which they are connected, and possess facilities
for acquiring information specially suited for the columns of the *Ironmonger*. *The Week*, *Legal Notes*, *Trade Notes*, *Bankruptcies*, *Foreign
Notes*, *Colonial Settings*, *Merchants' Circulars*, &c., are each departments of the journal, containing a digest of all matters of direct interest
to the Iron, Hardware and Metal Trades. In addition to the above, there is a carefully classified list of Patents, together with Editorial Notes, French,
Belgian and other Special Correspondence.

SUBSCRIPTIONS

to the *Ironmonger* and *Metal Trades' Advertiser*, with which is sent every fourth week the Foreign Supplement (see below), may commence from any
date, but are not received for less than a year complete. The rate is \$5 per annum, inclusive of postage to any part of the world outside Great Britain.
To every subscriber is presented, free, in the course of his year, a handsome and useful *Ironmongers' Diary and Text Book*, a work sold to non-
subscribers at 75 cents.

ADVERTISEMENTS

are inserted in the *Ironmonger* and *Metal Trades Advertiser* at the subjoined rates, from which no variation can be made on any ground whatever

Size of Page—Nine Inches Deep by Six Inches Wide.

One Advertisement of every Series of 13 Monthly, 27 Fortnightly, or 53 Weekly, will be inserted in
the *Ironmongers' Diary* and *Text Book*, published toward the end of each year,
and presented to every Subscriber.

	53 INSERTIONS, each net.	27 INSERTIONS, each net.	13 INSERTIONS, each net.	7 INSERTIONS, each net.	3 INSERTIONS, each net.	1 INSERTION, net.
One page.....	Gold. \$20.00	Gold. \$22.50	Gold. \$25.00	Gold. \$30.00	Gold. \$35.00	Gold. \$50.00
Two-thirds page.....	15.00	16.90	18.75	22.50	26.25	37.50
Half page.....	11.00	12.40	13.75	16.50	19.25	27.50
One-third page.....	8.00	9.00	10.00	12.00	14.00	20.00
Quarter page.....	6.40	7.25	8.00	9.60	11.20	16.00
One-sixth page.....	4.50	5.10	5.65	6.75	7.75	11.30
One-eighth page.....	3.60	4.10	4.50	5.40	6.25	9.00
One-sixteenth page.....	2.00	2.25	2.50	3.00	3.50	5.00

SPECIAL ISSUES.

In the spring and autumn of each year there is published a Special Issue, the circulation of which is not less than Twelve Thousand (12,000) copies

THE IRONMONGERS' DIARY AND TEXT BOOK.

This is an annual, presented free to every Subscriber to the *IRONMONGER* AND *METAL TRADES' ADVERTISER*.
It contains a large number of ruled skeleton pages for diary and other entries, and in addition much useful reference information, varied from year to
year. It is handsomely bound in cloth, gilt; and as copies are used in thousands of establishments for a whole year, it is obviously a medium of excep-
tional value for advertisements. Sold to non-subscribers at 75 cents.

THE FOREIGN SUPPLEMENT,

With which is incorporated The Universal Engineer,

is published every fourth week in connection with the extensive and world-wide circulation of the *Ironmonger* itself. The dates of its publication for the
next twelve months will be as follows:
JULY 21, AUGUST 22, SEPTEMBER 17, OCTOBER 8, NOVEMBER 6, DECEMBER 3 and 31, 1881, JANUARY 28, FEBRUARY 25, MARCH 25,
APRIL 22, MAY 20 and JUNE 17, 1882.

This Supplement is published in

FOUR LEADING COMMERCIAL LANGUAGES

of the world, including English, and is sent to all the countries where they are spoken, thus placing the contents of the *Ironmonger* not only within reach
out in the native language of eighty millions of German, forty-two millions of French, twenty-eight millions of Italian, and fifty-one millions of Spanish
speaking people; or, in all, over two hundred millions of inhabitants in the principal nations where the best purchasers of manufactured goods are to
be found.

Advertisements are inserted in any language at the following

MODERATE TARIFF.

Size of Page—13 1/2 Inches Deep by 9 1/2 Inches Wide.

	13 INSERTIONS, each net.	7 INSERTIONS, each net.	3 INSERTIONS, each net.		13 INSERTIONS, each net.	7 INSERTIONS, each net.	3 INSERTION, each net.
One page.....	Gold. \$30.00	Gold. \$33.75	Gold. \$37.50	Quarter page.....	Gold. \$10.00	Gold. \$11.25	Gold. \$12.50
Two-thirds page.....	22.00	24.75	27.50	One-sixth page.....	7.50	8.45	9.40
Half page.....	17.00	19.15	21.25	One-eighth page.....	6.20	7.00	7.75
One-third page.....	12.50	14.10	15.65	One-sixteenth page.....	3.20	3.40	4.00

Advertisers will do well to use Illustrations freely. Where economy of space is an object, a left page illustrated and described in one language can
be suitably described in four or more languages on the opposite or right page without illustrating.

THE WHOLE FOREIGN HARDWARE TRADE,

so far as our experience of twenty years is concerned, will be covered by THE FOREIGN SUPPLEMENT at least twice a year. Thus a Price List or advertise-
ment inserted in the *Ironmonger* and *Foreign Supplement* is a strikingly powerful and most efficient way of publicity not to be compared with any of the
other ordinary channels of communication.

B. KREISCHER & SONS, FIRE BRICK.

BEST AND CHEAPEST.
Established 1845.
Office, foot of Houston Street, East River,
NEW YORK.

NEWTON & CO.,

ALBANY, N. Y., Manufacturers of

FIRE BRICK

Stove Linings,

Range and Heater Linings

Cylinder Brick, &c., &c.

M. D. Valentine & Bro

Manufacturers of

FIRE BRICK
And Furnace Blocks
DRAIN PIPE & LAND TILE.

Woodbridge, - - - N. J.

BORGNER & O'BRIEN,

Manufacturers

FIRE BRICK

Edge Pressed Furnace Blocks,
CLAY RETORTS, TILES, &c.,
Twenty-third Street,
PHILADELPHIA.
Above Race,
Twenty years' practical Experience.

BROOKLYN

Clay Retort and Fire Brick Works,
(EDWARD D. WHITE & CO.)

Manufacturers of Clay Retorts, Fire Brick,
Gas House and other Tile.

VAN DYKE, ELIZABETH, RICHARDS & PARTITION STS.
Office, 88 Van Dyke St., Brooklyn, N. Y.

WATSON FIRE BRICK CO.,

ESTABLISHED 1856.

Successors to JOHN R. WATSON, Perth Amboy, New Jersey.

Manufacturers of

FIRE BRICK,

OR ROLLING MILLS, BLAST FURNACES, FOUN-
DRY GAS WORKS, LIME KILNS, TANNERIES,
BOILER and GRATE SETTING, GLASS WORKS, &c.
Fire Bricks, Fire Sand, and Kaolin for Sale.

HENRY MAURER,

Proprietor of the

Excelsior Fire Brick & Clay
Retort Works,

Manufacturer of FIRE BRICK, HOLLOW
BRICK AND CLAY RETORTS.

WORKS: PERTH AMBOY, NEW JERSEY.
Office & Depot, 418 to 422 East 23d St., N. Y.

TROY FIRE BRICK WORKS,

Troy, N. Y.,

JAMES OSTRANDER & SON,

ESTABLISHED 1848.

Manufacturers of

FIRE BRICK,

Fire Bricks, Blast Furnace Blocks, &c. Miners and
Dealers in Woodbridge Fire Clay and Sand, and Staten
Island Kaolin.

Established 1864.

GARDNER BROTHERS,

Manufacturers of

STANDARD SAVAGE FIRE BRICK,
TILE & FURNACE BLOCKS,
OF ALL SHAPES AND SIZES.

Clay Gas Retorts and Retort Settings, and
Miners and Shippers of Fire Clay.
OFFICE: 116 Smithfield St., Pittsburgh, Pa.
WORKS: Mt. Savage Junction, Md., and Lookport, Pa.

HALL & SONS,

FIRE BRICK,

Buffalo, N. Y.

CHAS. D. COLSON,

FIRE BRICK,

Foundry Facings, Sand, Tools and Supplies.

CHICAGO, ILL.

UNION MINING COMPANY.

Mount Savage Fire Brick.

EDWARD J. ETTING, Agent,

No. 230 South Third St., Philadelphia, Pa.

MILLER'S BRICK PRESSES

(Established 1844).

FIRE and RED BRICK,

And Brickmakers' Tools in General.

SAM'L. P. MILLER & SON,
309 South 5th St., Philadelphia.

GEO. M. EDDY & CO.,

Manufacturers of

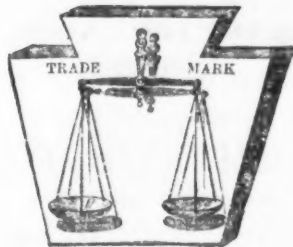
Measuring Tapes

of Cotton, Linen & Steel.

FOR ALL PURPOSES.

351 to 353 Classon Ave., Brooklyn, N. Y.

HENRY DISSTON & SONS,



KEYSTONE

SAW, TOOL, STEEL AND FILE WORKS,

Front and Laurel Streets,

PHILADELPHIA.

We have appointed

HAMMACHER & DELIUS, of Hamburg, Germany,

AGENTS FOR THE SALE OF OUR GOODS.

Any orders sent them will have the same prompt and careful attention as though they were
sent us direct. Hoping you will favor them with your orders, we are, Yours truly,

HENRY DISSTON & SONS.

Escutcheon Pins, Small Rivets and Screws,

And Specialties in this line made to order by

BLAKE & JOHNSON,
WATERBURY, CONN.

NEWTON'S PATENT STEAM TRAP AND GRATE BARS,

MANUFACTURED BY

PROVIDENCE STEAM TRAP CO., Providence, R. I.

See The Iron Age first issue of each month.

Agents Wanted for Different Locations.

ROCKING BLOCK GRATE,

Williams' Patent,

J. Q. MAYNARD,

General Agent.

97 Liberty Street, NEW YORK.

Fire level. Accumulation of cinders impossible.
No cleaning out of fires during the day. Parts
easily and cheaply replaced. Seventy per cent.
of air space. Thirty days' trial.
Send for circular.

Armstrong's Improved Adjustable Stock and Dies FOR PIPE AND BOLTS.



Tapped to the U. S. and Whitworth Standard Gauges. Adjustable to all variations in the size of
filings. Can be resharpened without drawing the temper by simply grinding them. Possessing prac-
tical advantages appreciated by all mechanics. Circular and Price List sent free on application.

Manufactured by F. ARMSTRONG, 30 Sterling St., Bridgeport, Conn.

The Farrel Foundry and Machine Co.

ANSONIA, CONN.,

Manufacture Improved

ROCK & ORE BREAKERS,

(THE "BLAKE" STYLE)

designed for breaking to small
pieces and one-third dust all kinds
of hard and brittle substances, such
as Quartz, Emery, Gold and
Silver Ores, Coal, Plaster,
Iron, Copper and Lead ores;
also, Stone for making Concrete
and Railroad Ballast.

View of Rock Breaker.

Twenty years of practical test at Home and Abroad, has proven this machine to be the best one
ever invented for the purpose. Mr. S. L. MARSH, for the past fifteen years connected with the manufacture
of these machines, has charge of this department of our works, and will personally superintend their erec-
tion within a reasonable circuit. Chilled Rolls and Rolling Mill Machinery; Power Presses, single
and double acting; also, Hammers, Drops and Lifters; Shafting, Pulleys and Hangers.

COPELAND & BACON, General Agents, 85 Liberty St., New York.

GREEN'S PURE SILICA FIRE BRICK,

MADE BY

LACLEDE FIRE BRICK MANUFACTURING CO.,

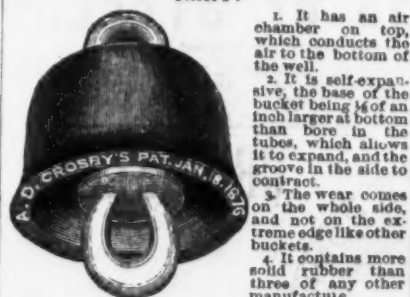
SPECIALLY ADAPTED FOR

Pernot and Siemens Open Hearth
Steel Furnaces and for Glass Furnaces.

Office, 901 Pine St., St. Louis, Mo.

The Most Durable and Best Selling Bucket for Chain Pumps.

It has no valves to become obstructed and no
screw joints to become immovable by rust.
Advantages of the Crosby Bucket over all
others:



1. It has an air
chamber on top,
which conducts the
air to the bottom of
the well.
2. It is self-expan-
sive, the base of the
bucket being 1/4 of an
inch larger at bottom
than bore in the
tube, which allows
it to expand, and the
groove in the side to
contract.
3. The wear comes
on the whole side,
and not on the ex-
treme edge like other
buckets.
4. It contains more
solid rubber than
three of any other
manufacture.

Send for Price List. Agents wanted in every
county. Address

A. D. CROSBY, Patentee and General Agent,
Cuba, Allegheny Co., New York.

ESTABLISHED 1866.

S. A. RIMINGTON,

Agent on this side for

RIMINGTON BROS. & CO.,

Newcastle-on-Tyne.

FIRE BRICKS,

Gas Retorts, Slabs, Blocks, Lumps, Fire Clay.

CANNISTER BRICKS,

Unequaled for standing intense heat.

P. O. Box 2139. Warehouse, 266 Water Street,
NEW YORK.

DAVID ROUND
HAND MADE COIL
CABLE & BLOCK
CHAINS.
CLEVELAND, O.
SEND FOR PRICES.

HOWARD IRON WORKS,

BUFFALO, N. Y.,

Manufacturers of

BENCH VISES,

Price Lists sent on application.

John T. Lewis & Bros.

No. 231 South Front St.,
PHILADELPHIA.



TRADE MARK.

MANUFACTURERS OF

Pure White Lead, Red Lead, Litharge,
Orange Mineral, Linseed Oil,
AND PAINTERS' COLORS.

Brooklyn White Lead Co.



TRADE MARK

White Lead, Red Lead & Litharge.
No. 182 Front Street,
NEW YORK.

JOHN JEWETT & SONS,

Manufacturers of the well-known brand of

WHITE LEAD.



TRADE MARK

ALSO MANUFACTURERS OF

LINSEED OIL.

182 Front Street, NEW YORK.



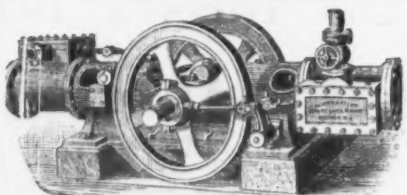
**The Atlantic White Lead and
Linseed Oil Co.,**

Manufacturers of

White Lead (Atlantic), Red Lead, Lith-
arge, Glass Makers' Litharge and
Orange Mineral;

LINSEED OIL,
Raw, Refined and Bled.

ROBERT COLGATE & CO.,
287 Pearl St., NEW YORK.



AIR COMPRESSORS.

ALLEN'S

HIGH SPEED AIR COMPRESSORS,

With Positive Moving Valves.

Allen Engines, Stationary and Marine Boilers,
Hoisting Machinery. Also, Patent Evaporators
and Condensers for Animal Matters.

AIR COMPRESSORS A SPECIALTY.

JOHN McLAREN,
Rice Street, - - - HOBOKEN, N. J.

WILLIAM H. ADNEY,
Chairman.

PETER D. WARREN,
Sec. and Treas.

Mellert Foundry & Machine Co.,

Limited.

(Works Established at Reading, Pa., in 1842.)

Manufacturers of

Specials, Flange Pipe, Retorts, Valves and Hydrants,
Lump Pumps, &c. The Improved Canadian Tur-
bine Water Wheel, Machinery and Castings
for Furnaces, Rolling Mills, Grist and Saw Mills, Min-
ing Pumps, Bolts, &c. Columns, Brackets, Iron
Railings, &c.
ARNOLD MELLERT, Supt., Reading, Pa.

PHILADELPHIA.

Corrected Weekly by Lloyd, Supple & Walton.

Terms, 30 days. For 60 or 90 days, interest added at 10 per cent. per annum.

Anvils.	
Peter Wright, # 1	1040
Over 250 lbs.	110
Eagle (American)	100 # 10-20 25
Apple Parers.	
Keystone Continental, 1875	4.00
1877	5.00
Reading No. 72	7.00
" No. 73	8.00
" No. 74	7.00
" No. 75	7.00
Rotary Peach Parer	15.00
Lots of 10 to 25 dozen special prices.	

Axes.	
Hunt's Kentucky and Yankee	per doz \$3.50
Man's Red Warrior	8.00
Richland Chief	8.00
Reveler Axes	8.00
Double Bit Axes	18.00

Augers and Auger Bits.	
Bates Nut Augers	dis 40 5
Cook's Augers	dis 40 5
Watrous Ship Augers	dis 15 5
Benjamin Pierce Auger Bits	dis 35 5
Gravold Auger Bits	dis 40 5
Cook's	dis 40 5
Jennings	dis 10, 10 20 5
Bonny's Pat. Hol. Augers, list	dis 40 5
Stearns' Pat. Hol. Augers, list	dis 40 5
Balances	dis 15 10 5
Light and Common	dis 15 10 5

Bells.	
Berlin Bros. Mfg. Co. Light Hand Bells	dis 60 10 5
Swiss Pattern Hand Bells	dis 60 10 5
Connell's Door Bell	dis 10 5
West. & Kentucky Cow, new list	dis 50 5
Belt and Rivet Clippers.	
Chambers' No. 1, 1 1/2, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	dis 15 5
" No. 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	dis 15 5
" No. 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	dis 15 5

Boring Machines.	
Upright, without Augers	dis 50 5
Angular, without Augers	dis 40 5
Bolts.	
Eastern Carriage Bolts	dis 80 5
Philadelphia	dis 80 5
Stanley, Wrought Shutter	dis 80 5

Braces.	
Barber's	dis 40 5
Boskus	dis 40 5
Spofford	dis 40 5
American Ball	dis 40 5
Butts.	
Cast Fast Joint, Narrow	dis 40 5
" Broad	dis 40 5
" Acorn Loose Pin	dis 40 5
" Mayer's Loose Joint	dis 40 5
Wrought Loose Pin	dis 40 5
Table Hinges and Back Flaps	dis 40 5
Narrow, Fast	dis 40 5
Loose Joint	dis 40 5

Blind Butts.	
Parker	dis 75 5
Chambers	dis 75 5
Shepard	dis 75 5
Lull & Porter	dis 75 5
Huffer	dis 75 5

Chains.	
German Hailor and Coll. new list Oct. 22	dis 25 5
Galvanized Pump	dis 25 5
Best Proof Coll Chain-English	dis 25 5

Chisels.	
Socket Framing	dis 40 5
Butcher's	dis 40 5
Chisels.—Bed (new list July 1, 1890)	dis 40 5
Plate	dis 40 5

Coffee Mills.	
Box and Side, new list Jan. 1	dis 45 5
Enterprise	dis 45 5
Cutlery.	
Walden Pocket	dis 45 5
Landers, Frary & Clark, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	dis 45 5
Goodnow, Mfg. Co. and Meridian Cutlery Co., Manufacturers' prices net.	

Drawing Knives.	
Hart Mfg. Co.	dis 60 10 5
Adjustable Handle	dis 15 5
Fry Pans.	
Tinned	dis 45 5
No. 1	dis 45 5
No. 2	dis 45 5
No. 3	dis 45 5
No. 4	dis 45 5
No. 5	dis 45 5
No. 6	dis 45 5
No. 7	dis 45 5
No. 8	dis 45 5
No. 9	dis 45 5
No. 10	dis 45 5
No. 11	dis 45 5
No. 12	dis 45 5
No. 13	dis 45 5
No. 14	dis 45 5
No. 15	dis 45 5
No. 16	dis 45 5
No. 17	dis 45 5
No. 18	dis 45 5
No. 19	dis 45 5
No. 20	dis 45 5
No. 21	dis 45 5
No. 22	dis 45 5
No. 23	dis 45 5
No. 24	dis 45 5
No. 25	dis 45 5
No. 26	dis 45 5
No. 27	dis 45 5
No. 28	dis 45 5
No. 29	dis 45 5
No. 30	dis 45 5
No. 31	dis 45 5
No. 32	dis 45 5
No. 33	dis 45 5
No. 34	dis 45 5
No. 35	dis 45 5
No. 36	dis 45 5
No. 37	dis 45 5
No. 38	dis 45 5
No. 39	dis 45 5
No. 40	dis 45 5
No. 41	dis 45 5
No. 42	dis 45 5
No. 43	dis 45 5
No. 44	dis 45 5
No. 45	dis 45 5
No. 46	dis 45 5
No. 47	dis 45 5
No. 48	dis 45 5
No. 49	dis 45 5
No. 50	dis 45 5
No. 51	dis 45 5
No. 52	dis 45 5
No. 53	dis 45 5
No. 54	dis 45 5
No. 55	dis 45 5
No. 56	dis 45 5
No. 57	dis 45 5
No. 58	dis 45 5
No. 59	dis 45 5
No. 60	dis 45 5
No. 61	dis 45 5
No. 62	dis 45 5
No. 63	dis 45 5
No. 64	dis 45 5
No. 65	dis 45 5
No. 66	dis 45 5
No. 67	dis 45 5
No. 68	dis 45 5
No. 69	dis 45 5
No. 70	dis 45 5
No. 71	dis 45 5
No. 72	dis 45 5
No. 73	dis 45 5
No. 74	dis 45 5
No. 75	dis 45 5
No. 76	dis 45 5
No. 77	dis 45 5
No. 78	dis 45 5
No. 79	dis 45 5
No. 80	dis 45 5
No. 81	dis 45 5
No. 82	dis 45 5
No. 83	dis 45 5
No. 84	dis 45 5
No. 85	dis 45 5
No. 86	dis 45 5
No. 87	dis 45 5
No. 88	dis 45 5
No. 89	dis 45 5
No. 90	dis 45 5
No. 91	dis 45 5
No. 92	dis 45 5
No. 93	dis 45 5
No. 94	dis 45 5
No. 95	dis 45 5
No. 96	dis 45 5
No. 97	dis 45 5
No. 98	dis 45 5
No. 99	dis 45 5
No. 100	dis 45 5

Files.	
Nicholson	dis 40 5
Diston	dis 40 5
Butcher	dis 40 5
Spencer	dis 40 5
E. M. Boynton, new list	dis 40 5

Fluting Machines.	
Eagle—3 1/2 in. roll	dis 20 5
Crown—3 1/2 in. roll	dis 20 5
"—3 1/2 in. roll	dis 20 5
"—3 1/2 in. roll	dis 20 5
Geneva Fluter	dis 25 5
Favorite com. Fluter & Sd Iron	dis 25 5

Hammers.	
Yorkes & Plumb's, new list	dis 30 5
Headless	dis 30 5
Boynton's Pat. Saw Hammer	dis 30 5
Yorkes & Plumb, new list	dis 30 5
Hunt	dis 30 5

Hinges.	
Stran and T.	dis 40 5
Horse Nails.	
Assorted	dis 25 5
Blue and Pointed	dis 25 5
Globe	dis 25 5
Clincon	dis 25 5
Polished & Pointed	dis 25 5
Porter, all sizes	dis 25 5
Discount on Assorted and Clincon, 30 1/2; Globe, 10 1/2; Locks and Knobs, 10 1/2.	

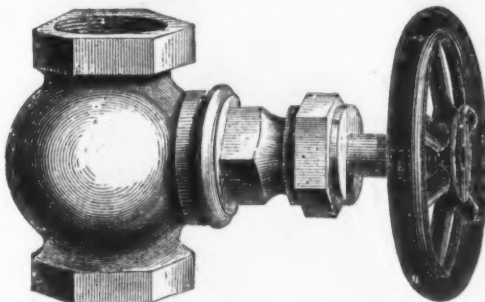
Locks and Knobs.	
Brantford	dis 40 5
Garford Cabinet	dis 40 5
American Padlocks	dis 40 5
Scandinavian Padlocks	dis 40 5
No. 1	dis 40 5
No. 2	dis 40 5
No. 3	dis 40 5
No. 4	dis 40 5
No. 5	dis 40 5
No. 6	dis 40 5
No. 7	dis 40 5
No. 8	dis 40 5
No. 9	dis 40 5
No. 10	dis 40 5
No. 11	dis 40 5
No. 12	dis 40 5
No. 13	dis 40 5
No. 14	dis 40 5
No. 15	dis 40 5
No. 16	dis 40 5
No. 17	dis 40 5
No. 18	dis 40 5
No. 19	dis 40 5
No. 20	dis 40 5
No. 21	dis 40 5
No. 22	dis 40 5
No. 23	dis 40 5
No. 24	dis 40 5
No. 25	dis 40 5
No. 26	dis 40 5
No. 27	dis 40 5
No. 28	dis 40 5
No. 29	dis 40 5
No. 30	dis 40 5
No. 31	dis 40 5
No. 32	dis 40 5
No. 33	dis 40 5
No. 34	dis 40 5
No. 35	dis 40 5
No. 36	dis 40 5
No. 37	dis 40 5
No. 38	dis 40 5
No. 39	dis 40 5
No. 40	dis 40 5
No. 41	dis 40 5
No. 42	dis 40 5
No. 43	dis 40 5
No. 44	dis 40 5
No. 45	dis 40 5
No. 46	dis 40 5
No. 47	dis 40 5
No. 48	dis 40 5
No. 49	dis 40 5
No. 50	dis 40 5
No. 51	dis 40 5
No. 52	dis 40 5
No. 53	dis 40 5
No. 54	dis 40 5
No. 55	dis 40 5
No. 56	dis 40 5
No. 57	dis 40 5
No. 58	dis 40 5
No. 59	dis 40 5
No. 60	dis 40 5
No. 61	dis 40 5
No. 62	dis 40 5
No. 63	dis 40 5
No. 64	dis 40 5
No. 65	dis 40 5
No. 66	dis 40 5
No. 67	dis 40 5
No. 68	dis 40 5
No. 69	dis 40 5
No. 70	dis 40 5
No. 71	dis 40 5
No. 72	dis 40 5
No. 73	dis 40 5
No. 74	dis 40 5
No. 75	dis 40 5
No. 76	dis 40 5
No. 77	dis 40 5
No. 78	dis 40 5
No. 79	dis 40 5
No. 80	dis 40 5
No. 81	dis 40 5
No. 82	dis 40 5
No. 83	dis 40 5
No. 84	dis 40 5
No. 85	dis 40 5
No. 86	dis 40 5
No. 87	dis 40 5
No. 88	dis 40 5
No. 89	dis 40 5
No. 90	dis 40 5
No. 91	dis 40 5
No. 92	dis 40 5
No. 93	dis 40 5
No. 94	dis 40 5
No. 95	dis 40 5
No. 96	dis 40 5
No. 97	dis 40 5
No. 98	dis 40 5
No. 99	dis 40 5
No. 100	dis 40 5

Lanterns.	
Salt City	dis 40 5
Square Candle	dis 40 5
Tubular	dis 40 5
Globe, 31 cents extra per doz. net.	

Lawn Mowers.	
Philadelphia	dis 40 5
Excelsior	dis 40 5

Lawn and Garden Pumps.	
Holland Patent	dis 40 5
Long and Short Cutter	dis 40 5
Pennsylvania Patters	dis 40 5
Enterprise Mfg. Co.'s Measuring Faucets	dis 40 5
Rebbins' Gate	dis 40 5
Lincoln's	dis 40 5
Landers, Frary & Clark's Potpourri	dis 40 5
Brass Liquor Cocks, new list Jan. 1, 1891	dis 40 5
Cork Lined	dis 40 5
Meat Cutters.—Pennsylvania Meat Cutters	dis 40 5
Dixon's	dis 40 5
Woodruff	dis 40 5
Stove	dis 40 5
Hale's	dis 40 5
American	dis 40 5
Stuffers	dis 40 5
Enterprise Stuffers	dis 40 5
Planes.—Ohio Tool Co.	dis 40 5
Secoto	dis 40 5
Auburn	dis 40 5
New York Tool Co.	dis 40 5
Balloy	dis 40 5
Plane Irons.—Ohio Tool Co.	dis 40 5
Butcher's	dis 40 5
Plumb and Levels	dis 40 5
Stanley's Adjustable	dis 40 5
Non-Adjustable	dis 40 5
Picks.—New list	dis 40 5
Pumps.—Bickford	dis 40 5
Stiles.—Stanley Boxwood	dis 40 5
Stanley Ivory	dis 40 5
Steel Yards.—Hart's Pattern	dis 40 5
Pat. No. 1	dis 40 5
Pat. No. 2	dis 40 5
Pat. No. 3	dis 40 5
Pat. No. 4	dis 40 5
Pat. No. 5	dis 40 5
Pat. No. 6	dis 40 5
Pat. No. 7	dis 40 5
Pat. No. 8	dis 40 5
Pat. No. 9	dis 40 5
Pat. No. 10	dis 40 5
Pat. No. 11	dis 40 5
Pat. No. 12	dis 40 5
Pat. No. 13	dis 40 5
Pat. No. 14	dis 40 5
Pat. No. 15	

McNab & Harlin Mfg. Co.,
MANUFACTURERS OF
BRASS COCKS AND VALVES,
For STEAM, WATER and GAS.
WROUGHT IRON PIPE AND FITTINGS,
PLUMBERS' MATERIALS
Factory, Paterson, N. J. 56 John Street, N. Y.



BLACK AND TINNED IRON RIVETS.



W. P. TOWNSEND & CO.,
PITTSBURGH, PA.,
Manufacturers of every description of First Quality
RIVETS.
HENRY B. NEWHALL,
105 Chambers St.,
New York Agent.

WM. H. HASKELL & CO.,
Pawtucket, R. I.
MANUFACTURERS OF
COACH SCREWS,
(With Gimlet Points),
ALL KINDS OF
Machine and Plow Bolts,
FORGED SET SCREWS
AND
TAP BOLTS.
HENRY B. NEWHALL,
105 Chambers St.,
New York Agent.



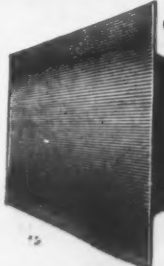

STANDARD NUT CO.,
Pittsburgh, Pa.,
MANUFACTURERS OF
HOT PRESSED
Square & Hexagon Nuts,
R. R. FISH BARS,
BOLTS,
SPIKES,
RIVETS, &c.
HENRY B. NEWHALL,
105 Chambers St.,
New York Agent.





Philadelphia "STAR" Bolt Works.
NORWAY IRON FANCY HEAD BOLTS,
Carriage & Tire Bolts. Star Axle Clips, &c.
TOWNSEND, WILSON & HUBBARD, 2301 Cherry Street, Philadelphia, Pa



MACHINE, PATCH AND STAY BOLTS.
HOOPES & TOWNSEND,
KEYSTONE BOILER RIVETS
PHILADELPHIA:
WOOD SCREWS, TANK RIVETS, FLAT LINK CHAIN.



BEECHER & PECK,
Successors to Milo Peck, Manufacturers of
PECK'S DROP PRESS
PECK'S DROP LIFTER is the only one which has its parts cushioned. Being thus cushioned they are the most durable Lifter in the market.
Can be attached to any drop now in use.
Our New Illustrated Catalogue is just out.
158 Temple Street, New Haven, Conn.



NORWAY IRON CARRIAGE & TIRE BOLTS,
Axle Clips, &c.
Only Medal, Phila., 1876.
COLEMAN EAGLE BOLT WORKS,
WELSH & LEA, Philadelphia, Pa.



F. M. HASLETT & CO.,
MANUFACTURERS OF
Carriage, Machine and Skein Bolts, Lag Screws, &c.
ALLEGHENY, PA.
W. K. ROSS, J. A. FULLER, W. K. FULLER, Sole Agents, 97 Chambers Street, New York.




Columbus Bolt Works,
COLUMBUS, OHIO.
MANUFACTURERS OF
Threshing Machine Teeth
For all the Leading Machines.
GENUINE NORWAY IRON CARRIAGE BOLTS.
Illustrated Catalogues and Prices mailed on application.



ESTABLISHED 1838.
CARRIAGE HARDWARE.
COACH TRIMMINGS.
Fancy Head Norway Carriage Bolts a Specialty.
C. COWLES & CO., New Haven, Conn.



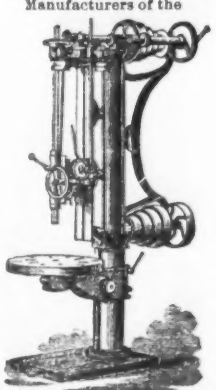
E. C. ATKINS & CO.
SHEFFIELD SAW WORKS.
SPECIALTY: LARGE CIRCULAR SAWS.
SOLE MANUFACTURERS OF THE GENUINE SILVER STEEL DIAMOND CUT SAW
INDIANAPOLIS, IND.



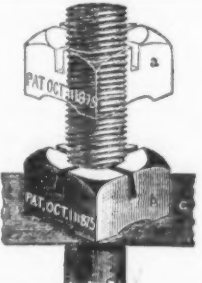
PHILADELPHIA SCREW CO., Limited,
Twelfth and Buttonwood Streets, PHILADELPHIA.
Manufacturers of
IRON & BRASS WOOD SCREWS.
Quality, finish and tests as to strength guaranteed equal to any in the market.
With improved facilities and largely increased capacity for production, we can fill orders promptly, and invite inquiries for discounts. A full line in stock.



P. BLAISDELL & CO.,
WORCESTER, MASS.,
Manufacturers of the
"BLAISDELL" UPRIGHT DRILLS
And other First-Class Machinists' Tools.
Only Medal Paris, 1878.



Atwood Safety Nut Co.,
Springfield, Mass.
J. W. LARABEE, Treasurer.
a. Atwood Nut on bolt without bearing on base-slots open. b. Atwood Nut turned to bearing c. partially closing the slots and grasping the bolt.



YOUNT'S
IMPROVED TIRE UPSETTER
will upset tire from 1/4 inch wide to a heavy log wagon tire 4 inches wide and 3/4 inch thick. will upset bar iron from 1 1/2 inch down.
For circular address,
INDIANAPOLIS MACHINE & BOLT WORKS
Indianapolis, Ind.




HOLT
PORTABLE FORGES
Manufactured by
HOLT MFG. CO.
Cleveland, Ohio.
New York Warerooms,
79 & 81 Reade St.
F. PORTER THAYER
Manager.



PITTSBURGH MFG. CO.
Manufacturers of Nail and Spike Machines, Bolt Nuts, Washers, Rivets, &c. Castings, Forging and Blacksmith Work promptly attended to.
OFFICE & WORKS, Railroad St. near 28th, Pittsburgh, Pa



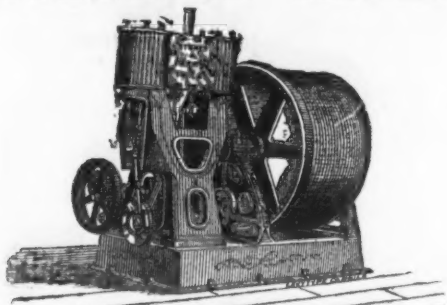
B. F. Mercer,
Manufacturer of
Wood Pumps
Plain and Porcelain Lined,
FOR STOCK WELLS, HOUSE WELLS & CISTERNS.
Send for Price List.
B. F. Mercer,
Alliance, O.



THE FALLS RIVET CO.
CUYAHOGA FALLS, O.
Tinned Belt Rivets and Burrs a specialty.



VERTICAL ENGINE



IRON FURNACE HOIST.

The above cut represents our Vertical Iron Furnace Hoisting Engine, having double cylinders, fitted with our improved reversing valves, automatic stop and brake.

Prices furnished on application for engine alone or for complete outfit.

Patterns on hand for various sizes.

STOKES & PARRISH, 3001 Chestnut St., Philadelphia.

\$\$\$ \$ SAVED \$\$\$

1977 NINETEEN HUNDRED SEVENTY-SEVEN 1977
MACHINES

BOTH NEW AND SECOND-HAND

COMPRISING
MACHINE AND BLACKSMITH
TOOLS OF EVERY DESCRIPTION.
WOOD-WORKING MACHINERY IN ALL ITS
BRANCHES. PORTABLE ENGINES. UPRIGHT AND HOR-
ZONTAL STATIONARY ENGINES. 1 TO
300 HORSE POWER. S.C.F. & CO. LOCOMOTIVE FIRE-
BOX, HORIZONTAL, and UPRIGHT BOIL-
ERS, 1 TO 100 HORSE POWER. WATER WHEELS, COT-
TON AND WOOLLEN MACHINERY, STEAM
PUMPS, CRISTMILL MACHINERY,
Etc., FULLY DESCRIBED, AND
PRICES ANNEXED.

Send stamp for same. In our List No. 23. [stating what you want.]

We have the Largest Assortment of Machinery to be found in the hands of any firm in the country.

Works and Main Office, Manchester, N. H. **S. C. FORSAITH & CO.**

Branch Office and Wareroom, 209 Center street, New York City.



Patent Felt and Asbestos Non-Conducting Removable Covering.

Easily Applied by Any One.

For steam boilers and pipes, hot and cold water pipes, refrigerators, meat cans, ice houses, &c.

Samples and circulars on application.

THE CHALMERS-SPENCE CO., Sole Proprietors, 10 Cortlandt St., N. Y.

Also Patent "Air Space," Non-conducting Cements, Hair Felt, the National Steel Tube Cleaner, Asbestos Materials, &c.

A. J. DAVIS & CO.,
Patent Friction Hoisting Engines

For Mines, Quarries, Dock Building, &c.

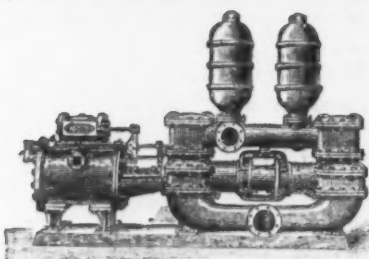
MANUFACTURERS OF

SHAPERS, DRAIN PIPE MACHINES, BAG AND
SACHEL MACHINERY,
Steam Engines, Wire Drawing
Machinery, &c., &c.

69 N. J. R. R. Avenue, Newark, N. J.

Correspondence solicited.

KEYSTONE STEAM PUMP WORKS,
PUMPS



AND
PUMPING MACHINERY

Of all Kinds.

THOMPSON, EPPING & CARPENTER,
PITTSBURGH, PA.

BLAKE
CRUSHER CO.,
New Haven Conn.



BLAKE'S
Challenge Rock Breakers.
Patented Nov. 18, 1879.
See The Iron Age first issue of the month.



Bradley's Cushioned Helve Hammer

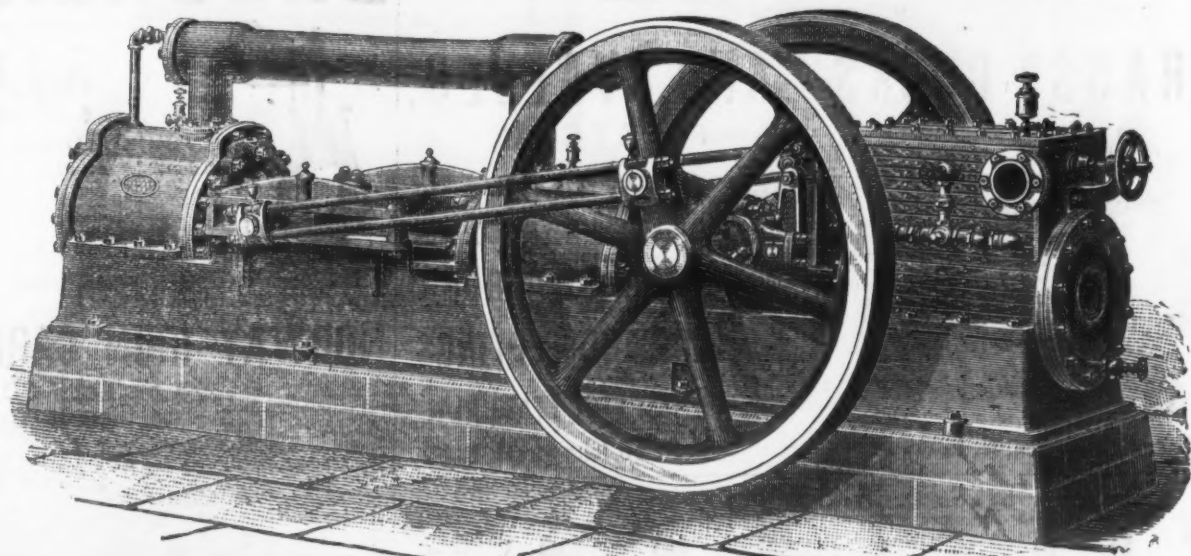
Awarded first premium. Silver Medal, at American Institute Fair, 1873; Cincinnati Industrial Exposition, 1874 and 1880, and the Diploma of Honor and Grand Medal of Merit at the Centennial Exhibition in 1876, being the highest award given any goods of their class in America or Europe. It has more good points, does more and better work, takes less power, costs less for repairs, than any Hammer in the world. Guaranteed as represented. Established 1832.

BRADLEY & COMPANY, Syracuse, N. Y.

THORNE, DeHAVEN & CO., Drilling Machines,
21st Street, above Market, Philadelphia.

PORTABLE DRILLS. Driven by power in any direction.
RADIAL DRILLS. Self-feed—Large Adjustable Box Table.
VERTICAL DRILLS. Self-feeding.
MULTIPLE DRILLS. 2 to 20 Spindles.
HORIZONTAL BORING AND DRILLING MACHINES.
HAND DRILLS. CAM BOX DRILLS.
SPECIAL DRILLS, For Special Work.

Air Compressors.



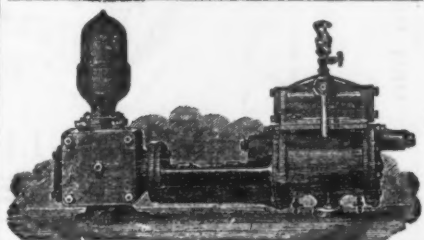
THE NORWALK IRON WORKS CO., South Norwalk, Conn.

A. S. CAMERON'S
PATENT

"SPECIAL" STEAM PUMP

Is the Standard of Excellence at Home and Abroad

For reduced price lists address **A. S. CAMERON, East 23d Street, New York.**



E. W. Bliss, BLISS & WILLIAMS,
MANUFACTURERS OF ALL KINDS OF

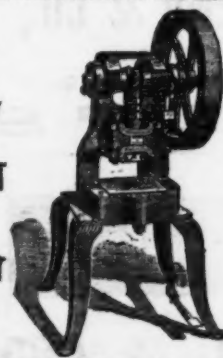
PRESSES

Also Manufacturers of
SPECIAL MACHINERY

FOR
WORKING SHEET
METALS, &c.
FRUIT & other
CAN TOOLS.



GOLD MEDAL AWARDED



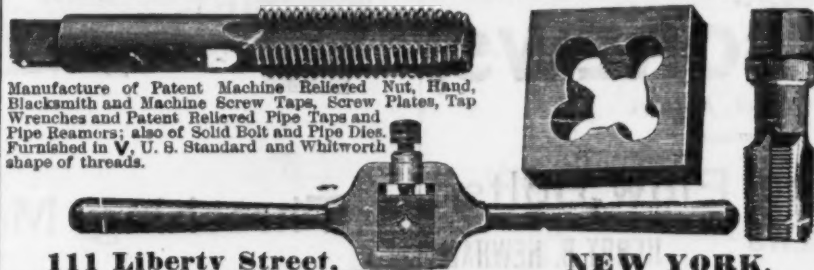
Plymouth, Pearl and
John Streets,
BROOKLYN, N. Y.,
U. S. A.



PARIS EXPOSITION, 1878.

H. S. MANNING & CO.,

Sole Sales Agents for THE MORSE TWIST DRILL AND MACHINE CO.'S



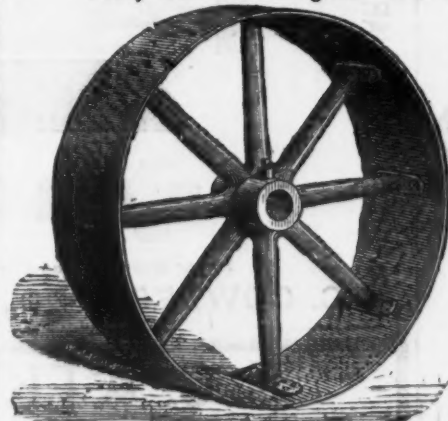
Manufacture of Patent Machine Relieved Nut, Hand, Blacksmith and Machine Screw Taps, Screw Plates, Tap Wrenches and Patent Relieved Pipe Taps and Pipe Reamers; also of Solid Bolt and Pipe Dies. Furnished in V. U. S. Standard and Whitworth shape of threads.

111 Liberty Street,

NEW YORK.

THE MEDART PATENT WROUGHT RIM PULLEY.

Forty Per Cent. Lighter and 100 Per Cent. Stronger



than any cast pulley. No shrinkage strains; perfectly balanced for high speeds; better surface for belt, and

The Cheapest Pulley in the Market.

We make these Pulleys from 10 inches to 10 feet diameter, any face, crowning or straight, split or whole, single or double arms.

Large Pulleys a Specialty.

Send for price list.

The Hartford Engineering Co.,
HARTFORD, CONN.

Sole licensed manufacturers for the New England, Middle and Atlantic Coast States.
Also Shafting, Hangers and Couplings.



DEAD-STROKE POWER HAMMERS.



DIENELT, EISENHARDT & CO.
MAKERS.
1310 Howard St., Philadelphia.

THE "EDDY" STRAIGHTWAY VALVES.

ALSO,
FIRE HYDRANTS.
Axe, Hatchet, Powder and
Brush Machinery.
MOHAWK & HUDSON MFG. CO.,
WATERFORD, N. Y.
BENTON, FAULKNER & BIRD, N. Y. Agents.
C. H. & W. H. MIDDLETON, Phila. Agents.

CRANE BROTHERS MAN'G. CO.,
CHICAGO.

MANUFACTURERS OF
WROUGHT IRON PIPE,
STEAM PUMPS,
STEAM and GAS FITTINGS.
Steam and Hydraulic
Freight and Passenger Elevators
STEAM HOISTING ENGINES
for Furnaces, Mines, &c.
Stationary Steam Engines &c.

Ludlow Valve Mfg. Co.,
OFFICE AND WORKS:
938 to 954 River St. & 67 to 83 Vall Ave., Troy, N. Y.
VALVES.



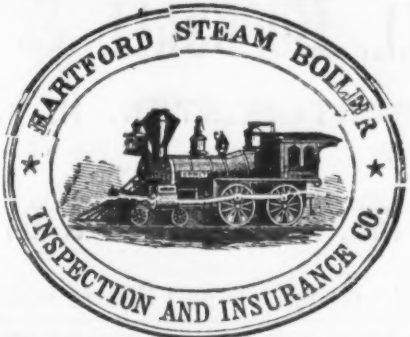
Double and Single Gate, 1/4 in. to 48 in.—outside and inside Screws, Indicator, &c.
for Gas, Water and Steam. Send for Circular.

Also FIRE HYDRANTS.

WICKERSHAM & CO.,
MANUFACTURERS OF
Railway, Miners', Mill & Machinists' Supplies
W. & Co.'s Packing: Steam, Hydraulic and Locomotive. Sam-
ples sent free.
Lubricants for Engines, Shafting, &c.; Rolling Mill, Railroad,
Gear and Axle Grease.
Also, Star Cylinder Oils.
Samples sent free for trial upon application.
No. 309 Race Street, Philadelphia, Pa.
COCHRANE & CO., Agents, 93 Fourth Ave., Pittsburgh.



Machinery, &c.



Issues Policies of Insurance after a careful inspection of the Boilers

COVERING ALL LOSS OR DAMAGE TO

Boilers, Buildings and Machinery.

ARISING FROM

STEAM BOILER EXPLOSIONS.

The Business of the Company includes all kinds of STEAM BOILERS.

Full information concerning the plan of the Company's operations can be obtained at the COMPANY'S OFFICE, HARTFORD, CONN., or at any Agency.

J. M. ALLEN, Pres. W. B. FRANKLIN, Vice-Pres. J. B. PIERCE, Sec.

Board of Directors:
J. M. ALLEN, President.
LUCIUS J. HENDEE, Pres't Fina Fire Ins. Co.
FRANK W. CHENEY, Asst' Treas. Cheney Brothers Silk Manufacturing Co.
CHARLES M. BEACH, of Beach & Co.
DANIEL PHILLIPS, of Adams Express Co.
JEO. M. BARTHOLOMEW, Pres't Amer. Nat'l Bank.
RICHARD W. R. JARVIS, Pres't Colt's Fire Arms Manufacturing Co.
THOMAS O. ENDERS, Sec'y Fina Life Ins. Co.
LEVERETT BRAINARD, of Case, Lockwood & Brainard.
GEN. WM. B. FRANKLIN, Vice Pres't Colt's Pat. Fire Arms Mfg. Co.
GEO. CROMPTON, Crompton Loom Works, Worcester, Philadelphia.
WILLIAM ADAMSON, of Baeder, Adamson & Co., Philadelphia.
RON. THOS. TALBOT, Ex-Governor of Mass.
NEWTON CASE, Case, Lockwood & Brainard, Hartford.
WILLIAM S. SLATER, Cotton Manufacturer, Providence, R. I.
NELSON HOLLISTER, of State Bank, Hartford.
D. H. SMITH, Pres't Springfield Fire & Marine Ins. Co.

LYON'S HAND OR POWER PUNCHES AND SHEARS.

For Round, Flat or Square Iron,

Polishing & Buffing Machinery,
HYDRAULIC JACKS,
To raise from 2 to 120 tons.

HYDRAULIC PRESSES,
For special and general use.

HYDRAULIC HAND & POWER PUMPS
with 1 to 6 plungers, to run hydraulic presses, with either uniform or changeable speed.

Second-Hand Presses,
E. LYON & CO.,
470 B Grand Street, NEW YORK.

THE MACKENZIE PATENT CUPOLA & BLOWER.

Send for circular to
Smith & Sayre Mfg. Co.,
PROPRIETORS, 245 Broadway, New York.

This Cupola has made a great revolution in melting Iron. It differs from all others in having a conical reverse, or in other words, the blast enters the fuel at all points. Above one ton capacity per hour, they are made oval in form. This brings the blast to the center of the furnace with the least resistance and smallest possible amount of power, and in combination with the continuous Tuyere causes complete diffusion of the air throughout the furnace, and uniform temperature, melting ten or fifteen tons an hour with the pressure of blast required to melt two or three tons in an ordinary Cupola. It also enables us to save very largely in time and fuel, the experience of our customers showing a gain of twenty-five to fifty per cent. in time, and twenty-five to forty per cent. fuel over the ordinary Cupola, and a better quality of casting, especially in light work. This is due to the thorough diffusion of the air and more perfect combustion, extracting less carbon from the iron, making a softer and tougher casting.

We manufacture these Cupolas of any desired capacity, numbered from 1 to 20, inclusive, the numbers indicating the melting capacities in tons per hour—No. 1, one ton; No. 2, two tons; No. 3, three tons per hour, and so on up to 20 tons. We have improved the construction of these Cupolas in every way, have increased their strength and durability, and sought to make them as convenient for working and repairs as our own and the experience of our customers could suggest.

NEW OTTO SILENT GAS ENGINE.

Working Without Boiler, Steam, Coal, Ashes or Attendance.

Started Instantly by a Match, it gives Full Power Immediately.

When Stopped, all Expense Censured. No explosions, no fires nor cinders, no gauges, no pumps, no engineer or other attendant while running. Recommended by Insurance companies.

UNSURPASSED IN EVERY RESPECT for hoisting in warehouses, printing, ventilating, running small shops, &c.
2, 4 and 7 H. P. and upwards. Built by
SCHLEICHER, SCHUMM & CO.,
Engineers and Machinists,
3045 Chestnut Street, Philadelphia.

PUNCHING & SHEARING PRESSES.

DRILL PRESSES.
Power, Foot or Hand Punches, and Shears; all sizes, from \$25 to \$5000.
Bar-Iron Shears, cut 1/2 x 4 in.; weight, 350 lbs., \$65;
New Upright Power Drills, back geared, self feed, quick return motion, swing 22 in., with countershaft, weight 600 lbs., only \$125.
Small size, drills up to 1/2 in., lever feed, swing 13 in., countershaft and self-center chuck; only \$85.
Peerless Punch and Shear Co.,
115 W Liberty Street, NEW YORK CITY.

KEYSTONE Portable Forges,
All sizes, for the lightest to the heaviest work, run by Chain Gear and Flat Belts. Strong blast and durable. Send for Catalogue and Price list to
KEYSTONE Forge Co.,
204 N. Fourth St., Philadelphia.

BUY YOUR Engineers' & Machinists' Supplies

OF J. F. ROGERS & CO.,
107 Liberty St., New York.
Taps, Drills, Packings, Oils, Emory Wheels, &c.

BAILEY ELEVATOR
AND PORTABLE HOIST.
Warranted double the power and not one-half the price of other hoists. As a proof of the above I will give them 30 days on trial. Send for catalogue and price list. Address,
J. DUNN, 32 Bank Street, CLEVELAND, OHIO

Machinery, &c.

WILLIAM SELLERS & CO.,
PHILADELPHIA.

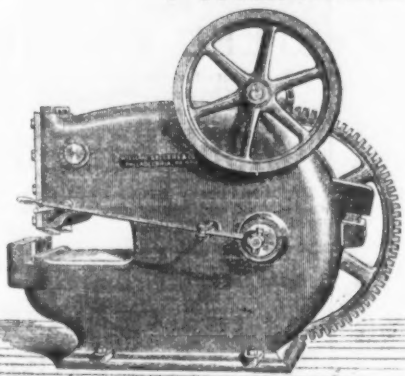
Manufacturers of

Iron & Steel Working Machinery,
MACHINISTS' TOOLS,

SHAFTING,

GEARING, &c.,

INJECTORS.



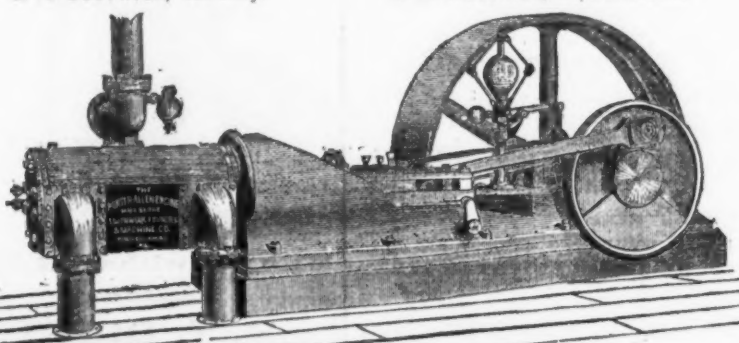
Shearing Machine.

BRANCH OFFICE, 79 Liberty Street, New York.

THE PORTER-ALLEN HIGH-SPEED STEAM ENGINE

W. H. MERRICK, Pres. and Treas.
G. A. BOSTWICK, Secretary.

C. T. PORTER, Vice-President.
C. B. RICHARDS, Superintendent.



Belts and gearing dispensed with, for any speed up to 600 revolutions per minute. Especially adapted to Rolling Mill work, Factories and Electric Light Machines.
Having extensive foundry facilities the company are prepared to contract for Iron and Brass Castings.
With largely increased facilities we are prepared to fill all orders for the Porter-Allen High Speed Engine on contract time. Prices and terms will be furnished on application.
Business communications, to receive prompt attention, must be addressed to the company.
SOLE MAKERS,

THE SOUTHWARK FOUNDRY AND MACHINE CO.,
430 Washington Avenue, Philadelphia.

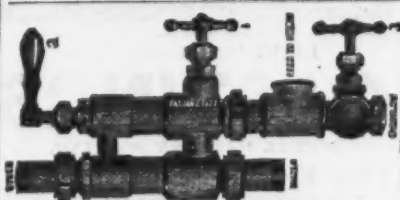
THE NEW PULSOMETER
ONCE MORE AHEAD.

FIRE! FIRE!! FIRE!!!
From NATIONAL LINE, Pier No. 39, North River, Foot of Houston St., New York, May 19, 1881.

PULSOMETER STEAM PUMP CO.:
In addition to my memo. dated March 5, I specially desire to inform you of the working of your No. 7 New Pulsometer as a fire-extinguisher. After having done with it for the purpose that it was intended for (pumping water from the coffer dam), I find it placed in the fire room simply for storage in case it should be required again for the same purpose. Afterwards, it was put up for washing down the wharf, and by applying a 2 1/2 inch nozzle, salt water was drawn from the river and thrown a perpendicular distance of 100 feet; so in case of fire on any part of the pier the pump can be set working almost instantly.
I congratulate you on the improvements I have discovered you have made and the many uses it can be applied to. We are always ready to exhibit it to those looking for such a pump, and every pier and warehouse where steam is used should not be without a New Pulsometer.
Yours truly,
GEO. L. ANDREWS, Wharfinger.
Send for book giving full description, reduced prices, and many letters of commendation from leading manufacturers and others throughout the country who are using them.

PULSOMETER STEAM PUMP CO., 83 John St., N. Y.
Chicago Office, 193 Lake St., H. T. CASWELL.

BOILERS SAFE FROM DESTRUCTIVE EXPLOSION
25000 H.P. IN USE. SEND FOR CATALOGUE.
HARRISON BOILER WORKS, PHILA.



GOLD MEDAL, PARIS EXHIBITION, 1875.

THE HANCOCK INSPIRATOR,
New Combined Pump and Injector.
Relieves all other appliances hitherto introduced for feeding Steam Boilers. A Portable Boiler is not perfect without one. It lifts its water 24 feet with a low steam pressure, and puts it directly into the boiler. No adjustment necessary for varying steam pressures.
G. W. STORER, General Agent, 149 N. 3d St., Phila.

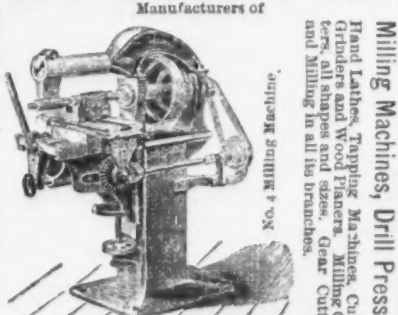


A. H. MERRIMAN,
Meriden, Conn.,
Manufacturer of all Descriptions of
PRESSES.
Catalogue and prices sent on application.

COOKE & CO.,
(Formerly COOKE & BROS.)
6 Cortlandt Street, New York.

GENERAL MACHINERY & SUPPLIES
for Machinists, Mills, Mines and Manufacturers.
Drawings and specifications furnished and estimates made.

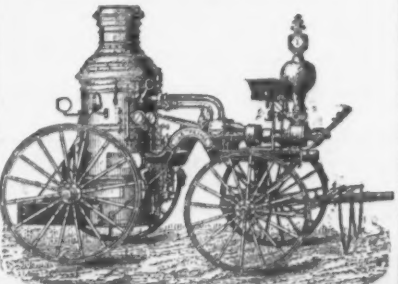
E. E. CARVIN & CO.,
Manufacturers of



139-143 CENTRE STREET,
Cornell's Building, NEW YORK.
Send for Illustrated Catalogue.

THE LA FRANCE FIRE ENGINE CO.

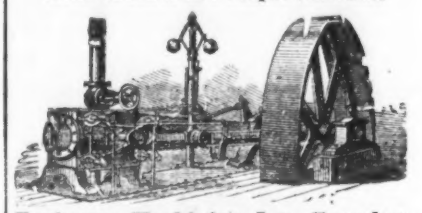
Manufacturers of



Rotary Steam Fire Engines
ELMIRA, N. Y.

Machinery, &c.

Corliss Engine Builders,
With Wetherell's Improvements.



Engineers, Machinists, Iron Founders and Boiler Makers.

ROBT. WETHERILL & CO. Chester Pa.

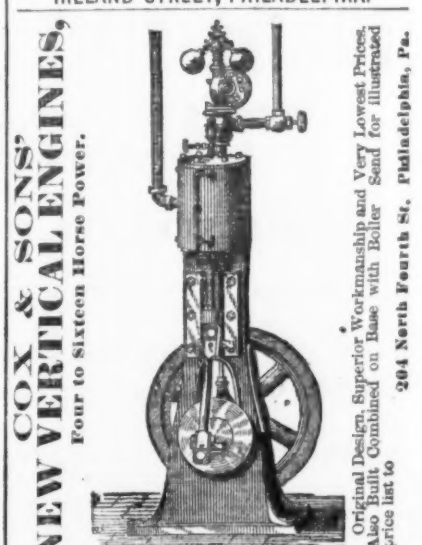
CHARLES W. ERVIE & CO.,

Engine Builders, Boiler

Makers and

GENERAL MACHINISTS,

IRELAND STREET, PHILADELPHIA.



Box's Patent Portable Double Screw Hoists, &c., &c.

FIRST PREMIUMS WHEREVER EXHIBITED.
Philadelphia, Pa., 1879. St. Louis, Mo., 1879.
Cincinnati, O., 1880. Philadelphia, Pa., 1880.

Box's New Patent Portable Right and Left Screw Hoist.

The latest Invented Hoist, with all Box's Patented Improvements added. Guaranteed in every particular Positive in action, and double the power of other Hoists. No thrusts; no friction. Single strong lift chain, and perfect guides to both hand and lift chains. It cannot be beat. Sizes from 1000 to 12,000 pounds capacity. BOX'S PATENT PORTABLE DOUBLE SCREW HOISTS. Always reliable. Sizes 15,000 and 20,000 pounds capacity. BOX'S PATENT PORTABLE LIGHT QUICK HOIST. Simple. Durable. Cheap. Light. Sizes 500 and 1000 pounds capacity.

BOX'S PATENT POWER OR HAND ELEVATOR. Sizes 1000 to 20,000 pounds capacity. BOX'S PATENT RADIAL DRILLS, &c. Full description circulars furnished.

Northern Liberties Works.
ALFRED BOX & CO.,
312 & 314 Green Street, Philadelphia, Pa.

Edwin Harrington & Son
Established 1807.

MANUFACTURERS OF
PATENT EXTENSION AND
SCREW CUTTING

LATHES,
Iron Planers,
Radial, Upright, Suspension,
Multiple and Lever

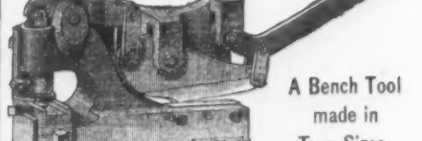
DRILLS,
and a variety of other
MACHINISTS' TOOLS.

Patent
Double Chain Screw
Pulley Blocks,
unrivalled for Durability,
Safety and Power.

Patent Double Chain
Quick-Lift Hoists,
with Brake for quick and easy
lowering.

Circulars furnished.
WORKS AND OFFICE,
Cor. N. 14th and Penna. Ave.,
Philadelphia, Pa., U.S.A.
Represented by J. Q. MAY-
NARD, 22 Liberty Street, N. Y.
C. E. KIMBALL, 138 Oliver St.,
Boston.

COMBINED SHEAR & PUNCH



A Bench Tool made in Two Sizes.
This tool can be secured to a bench. It is a very effective and convenient little tool. Prices very low.
No. 1 cuts 1 1/2 inch iron; No. 2 cuts 3 1/2 to 4 inch iron.
Manufactured by

J. E. HULL,
No. 137 East Pearl St., Cincinnati, O.
Send for Circular and Price List.



KATZENSTEIN'S Self-Acting Metal Packing,
For Piston Rods, Valve Stems, &c.
Of every description
For Steam Engines, Locomotives, Pumps, &c., &c.
Adopted and in use by the principal Iron Works and Steamship Companies within the last eight years in this and foreign countries. For full particulars and references address
L. KATZENSTEIN & CO.,
35 Deerpont Street, N. Y.

TUBAL SMELTING WORKS.

760 South Broad Street, PHILADELPHIA.

PAUL S. REEVES,

MANUFACTURER OF

ANTI-FRICTION METALS.CAR & MACHINERY BRASSES, INQOT BRASS
AND SOLDER, WHITE BRASS.

Old Metals and Brass Turnings Wanted.

ESTABLISHED 1842.

WM. & HARVEY ROWLAND,
PHILADELPHIA,

P. O. Address: Frankford, Philad'a. MANUFACTURERS OF ALL KINDS OF

Elliptic, Platform AND C Springs,**"Brewster Side Bar Combination
Patented" Springs.**

MADE EXCLUSIVELY FROM

SWEDISH STOCK, OIL-TEMPERED and WARRANTED.

Swedish Tire, Toe, Blister and Spring Steel.

CAST SPRING AND PLOW STEEL.
CAST SHOVEL, HOE AND MACHINERY STEEL.

OXFORD TOE, SLEIGH, TIRE AND SPRING STEEL.

BESSEMER SHOVEL AND PLOW STEEL.

BESSEMER MACHINERY AND CULTIVATOR STEEL.

RE-ROLLED NORWAY SHAPES.
NORWAY NAIL RODS ROLLED AND SLIT FROM SUPERIOR BRANDS.**STEEL
CASTINGS**FROM 1-4 TO 10,000 LBS. WEIGHT.
True to pattern, sound and solid, superior in strength, toughness and
durability to iron forgings, in any position, or for any service what-
ever. Gearing of all kinds, Shafts, Dies, Hammerheads, Crossheads
for Locomotives, etc. 15,000 Crank Shafts and 10,000 Gear wheels of
this steel now running prove its superiority over other Steel Cast-
ings. CRANK SHAFTS, CROSSHEADS AND GEARING ARE SPE-
CIALTIES. Circulars and Price Lists free.
Address
CHESTER STEEL CASTINGS CO.,
Works, Chester, Pa. 407 Library St., Philadelphia.**IMPROVED STEEL CASTINGS.**

Under Hainsworth's Patents.

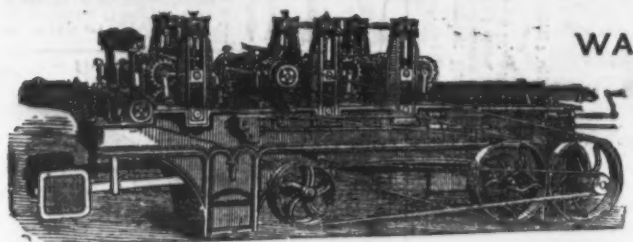
We make Castings practically free from blow-holes, of steel which is as soft and as
easily WORKED and WELDED as Wrought Iron, yet is STIFF, STRONG and DURABLE, with a
TENSILE STRENGTH of not less than 65,000 lbs. to the square inch. In short, our CAST-
INGS UNITE THE QUALITIES OF STEEL AND WROUGHT IRON.Wheels and Pinions, Dies and Hammer Heads, Engine and Machinery Castings of all
descriptions, Railroad Frogs and Crossings, Plowshares, Moldboards and Landsides.

WE USE NO CAST IRON.

Send for circular.

PITTSBURGH STEEL CASTING CO.,
PITTSBURGH, PA.**PUNCHING PRESSES,****DROP
HAMMER****DIES AND OTHER TOOLS**

For the Manufacture of all Kinds of

Sheet Metal Goods, Drop
Forgings, &c.**STILES & PARKER PRESS CO.,**
MIDDLETOWN, CONN.**Wood-Working Machinery.**

WAREROOMS,

172 High Street,
BOSTON.61 S. Canal Street,
CHICAGO.FOR
Railroad Shops, Planing Mills, Car Builders, Cabinet,
Carriage, Sash, Door and Blind Makers.

We also deal in all kinds of

MACHINERY AND SUPPLIES.**S. A. WOODS MACHINE COMPANY,**
NEW YORK.
Illustrated catalogues on application.**RIPLEY MANUFACTURING CO.,**
Unionville, Conn., U. S. A.**BEST PORCELAIN-LINED LEMON SQUEEZERS**
"COMMON SENSE" MOUSE TRAPS.
HAND-MADE ROSEWOOD FAUCETS, &c., &c.**STANLEY G. FLAGG & CO.**

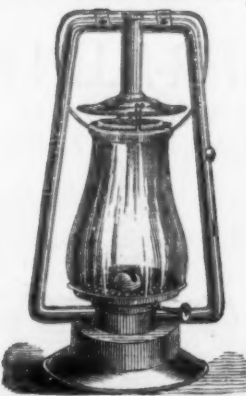
PHILADELPHIA, PA.

Office and Works,

N.W. cor. 19th St. & Pennsylvania Ave.
Manufacturers of**STEEL CASTINGS.**A Substitute for Steel & Wrought Forgings.
Send for circular.**Steel Castings,**Light and heavy Steel Castings of superior
metal, solid and homogeneous. All work guaran-
teed. Send for circular.**EUREKA CAST STEEL CO.,**
Chester, Pa.

Office: 307 Walnut St., Phila.

THE GENUINE

**No. 0 Tubular
LANTERN,**

With and without Guards,

Is Manufactured by

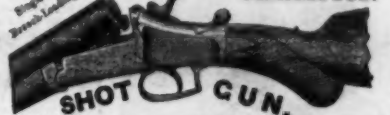
R. E. DIETZ,

54 & 56 Fulton St., NEW YORK.

**COLUMBIA BICYCLE**The bicycle, an permanent,
practical road vehicle, is an
acknowledged fact, and the
thousands in daily use are
constantly increasing in num-
bers. It combines speed and
endurance that no horse can
equal, and for pleasure or
health is far superior to any
other out-door sport. The art
of riding is easily acquired,
and the exercise is recom-
mended by the medical pro-
fession as a means of renew-
ing health and strength, as it
brings into action almost
every muscle of the body.
Send 2c. stamp for 25 page il-
lustrated catalogue, contain-
ing price lists and full infor-
mation.

THE POPE MFG. CO.,

597 Washington St., Boston, Mass.

New Model, Top Snap, CHAMPIONIt has a Patent Top Snap Action, by means of
which the gun can be opened by pressing the lever either to
the right or left; an improvement found in no other gun. It
has the Rebounding Lock, which ensures safety in
loading beyond a doubt. Other improvements are the
Pistol Grip Stock, and the Patent Fore-End
Fastening. By means of the Patent Fore-End Fastening
the barrel can be detached from the stock in an instant, and
as quickly replaced. The shells used in this gun are the cen-
tral fire, paper or brass. The brass shells can be reloaded
many times. Prices: Plain Barrels, 12 bore, \$18.00; Plain
Barrels, 10 bore, \$19.00. Address
JOHN F. LOVELL & SONS, Gun Dealers, Boston, Mass.
Send stamp for Illustrated Catalogue.

Light Soft Gray Iron

CASTINGS

METAL PATTERN MAKING.

The Elwell Hardware Co.,
P. O. Box 1914, Bridgeport, Conn.**THE GREATEST
ROCK BREAKER ON EARTH**And we guarantee it to do double the work of
any upright convergent jaw crusher. And we
challenge any manufacturer to a trial any time in
Chicago. Send for Circulars.**CATES & SCOVILLE IRON WORKS,**
52 Canal Street, Chicago, Ill.**TACKLE BLOCKS.**Rope and Iron Strap of all kinds. Lig-
num vitae Wood for Ten-Pin Balls.**Wm. H. McMillan & Bro.,**

Office, 113 South Street, New York.

Factory, 39 to 40 Penn St., Brooklyn, E. D.

AIR COMPRESSORS.
PRICES REDUCED. SEND FOR NEW CATALOGUE.**CLAYTON STEAM PUMP WORKS.**
14 AND 16 WATER STREET, BROOKLYN, N.Y.**Scranton Brass Works,****J. M. EVERHART,**

Manufacturer of

BRASS WORK,

For Water, Gas & Steam. Also

Carr & Wilcox's Patent Cut Files.
Will cut faster, wear longer, and slog
less than any File in the market.**ONE Street, SCRANTON, PA.****RUSSELL, BURDSALL & WARD,**

PORTCHESTER, N. Y.,

MANUFACTURERS OF

CARRIAGE, TIRE, PLOW, STOVE & OTHER BOLTS.

Carriage Bolts made from Best Square Iron a Specialty.

JOHN RUSSELL CUTLERY CO.,

Green River Works,

MANUFACTURERS OF

Table and Pocket Cutlery,

BUTCHERS', HUNTERS', PAINTERS', DRUGGISTS' & HOUSEHOLD KNIVES

IN ALL STYLES AND VARIETIES.

OLDEST AND LARGEST AMERICAN MANUFACTURERS.

New York Office,

25 Chambers Street.

Factories,

Turners Falls, Mass.

F. W. WURSTER,

IRON FOUNDRY

AND AXLE WORKS,

130 to 149 First St.,
Brooklyn, N. Y.**AXLES**SUPERIOR
WAGON, CART AND
TRUCK AXLES.Our facilities enable us to quote the
trade lower prices than any other
manufactory. Send for price list.**J. M. CARPENTER**

PAWTUCKET, R.I.

MANUFACTURER OF TAPS AND DIES.

E. M. BOYNTON,

Manufacturer of all kinds of

**First-Class Saws, Frames, Cross-Cut Handles,
TOOLS, FILES, &c.**

Also sole Proprietor and Manufacturer of the

GENUINE PATENT LIGHTNING SAW

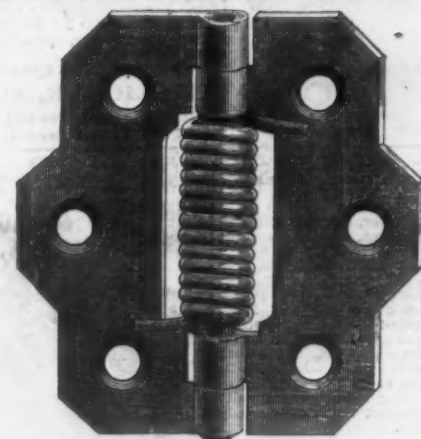
80 Beekman Street, NEW YORK.

I have during the year added to my extensive facilities the construction of a new Saw Manufactory
100 feet by 50 feet, comprising 35, 38, 40 and 42 Devco street. I have purchased costly land and erected
an additional four-story brick manufactory, in order to fill special orders for my rapidly increasing busi-
ness. The new addition comprises about 30,000 feet of floor space, filled with the latest improvements
in automatic machinery for saw manufacturing. For grinding circular saws I have a new machine,
admitted to be unsurpassed in accuracy and speed. I have also three horizontal machines for grinding
cross-cuts, mill saws, hand saws, buck-saws, &c., with capacity for over 1000 saws per day.
I have added extensive File Works, but shall make only best hand-cut Files, as in filing saws I find
them the cheapest at the higher cost. I can fill special orders, and shall expect at all times to have on
hand, at my store, 80 Beekman Street, New York, a few thousand dozen each Hand Saws,
Cross-cuts and Files, Saw Sets, Patent Handles, &c.**ACME SPRING HINGES**

For Screen Doors,

WROUGHT OR MALLEABLE IRON,

Walnut Bronzed,

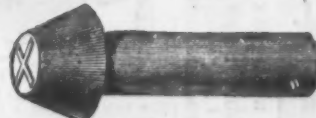
WITH BRASS SPRINGS.PRICES
VERY
LOW.SEND
FOR
LIST.**VAN WAGONER & WILLIAMS,**

MANUFACTURERS OF

Am. and Gem Spring Butts, Gem, Star, Torrey and Bee Door Springs;

Domestic Blind Adjusters, and other Hardware,

82 Beekman Street, NEW YORK.

BALTIMORE RIVET AND SPIKE WORKS.Rivets,
Spikes,
Bolts,
Nuts.Washers,
Bolt Ends,
Wood Screws,
Track Bolts.**WM. GILMOR of WM., cor. President & Fawn Sts.**